

AIR SUPPLY OPERATIONS IN THE
CHINA-BURMA-INDIA THEATER
BETWEEN 1942 AND 1945

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fulfillment of the requirements for the
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Military History

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

AIR SUPPLY OPERATIONS IN THE CHINA-BURMA-INDIA THEATER
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The USAAF responded to the requirement to keep China engaged against Japan by conducting two distinct air supply operations, a tactical air supply mission to Burma and a strategic air supply effort over the Himalayas to China. The tactical air supply effort to Burma supported offensive combat operations and the construction of the Ledo Road, while the Hump airlift directly contributed to the American strategic objective. Despite Stilwell's stubborn commitment to the Ledo Road as the main effort to supply the Chinese and to the necessary use of tactical air supply to support this and other ground operations in Burma, the key contribution to the success of keeping China in the war against Japan was ultimately the strategic air supply missions over the Hump. This thesis reviews how the operational airlift efforts within the CBI supported both efforts and examines the challenges, processes, and development of air supply. The fundamental question associated with this effort concerns how the USAAF responded to seemingly competing air supply requirements in the CBI Theater in order to keep China in the war against Japan.

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ACRONYMS

AAF	Army Air Force
ABC	Assam-Burma-China Ferry Command
AMC	Air Mobility Command
AMMISCA	American Military Mission to China
AOC	Air Operations Center
ATC	Air Transport Command
AVG	American Volunteer Group
C2	Command and Control
CATF	China Air Task Force
CBI	China-Burma-India Theater
CCP	Chinese Communist Party
CCS	Combined Chief of Staff
CNAC	China National Air Corporation
CONUS	Continental United States
DZ	Drop Zone
EAC	Eastern Air Command
IBS	India Burma Sector
IBT	India Burma Theater
ICD	India China Division
ICW	India China Wing
KMT	Nationalist Chinese Party
LOC	Line of Communication
MSR	Main Supply Route

NCAC	Northern Combat Area Command
PLM	Production Line Maintenance
RAF	Royal Air Force
SEAC	Southeast Asia Command
SOS	Services of Supply
TACC	Tanker Airlift Control Center
TCC	Troop Carrier Command
TCG	Troop Carrier Group
TCS	Troop Carrier Squadron
USAAF	United States Army Air Forces
USAF	United States Air Force or the United States Army Forces

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CHAPTER 1

INTRODUCTION

Background

The United States Army Air Force (USAAF) entered World War II confident in its ability to conduct strategic bombing and dispatch enemy pursuit aircraft. Regrettably, it had to learn from its own mistakes that it was not prepared to handle the requirement of air supply. However, such a critical mission became the single most important operation in a small theater of war in the Far East called the China-Burma-India Theater (CBI). With little to no doctrine, hundreds of aircrews participated in a great effort to resupply an entire nation and a geographically separated air force by air alone. The task was monumental and required leadership, innovation, and perseverance. Achieving success meant taking on the impossible and beating the odds. The impressive air operations in the CBI over 60 years ago form the nucleus of the United States Air Force's present day Air Mobility Command (AMC). The men and women that made up the air supply effort in the CBI during World War II faced many challenges and overcame them through will power and ingenuity. They accomplished this despite the lack of understanding of air supply doctrine among the senior leadership of the day and forged the new concepts of air supply ever-present today.

The concept of air supply was not new. In World War I, a minor air supply operation took place to resupply the American "Lost Battalion," using bombers to airdrop supplies to the troops below. Though the mission of 1918 met with little success, it planted a seed that air power could be used to support fielded land forces materially, not just as an offensive weapon on the battlefield. Unfortunately, the military planners during

the interwar period envisioned a different role for air supply and placed greater emphasis on the procurement of strategic bombers and fighters. The theorists of the day, Douhet, Mitchell, and Trenchard, were great thinkers on the strategic effects possible from bombers but gave little attention to the concept of air supply.

Today, AMC is the premier airlift force in the world and delivers on average of nearly 40 million-ton-miles per day to the far reaches of the globe.¹ It conducts humanitarian airlift missions, airdrops of troops and supplies, and provides the global reach of the air force with the ability to conduct long-range strike missions by providing aerial-refueling support. The USAAF's experiences in the CBI gave rise to the theory and doctrine of air mobility and, subsequently, as an independent air force, the USAF applied what it had learned to the Berlin Airlift, the Korean Conflict, the Vietnam War, Operation Nickel Grass, Operations Desert Shield and Desert Storm, and Operations Iraqi Freedom and Enduring Freedom. The CBI provided the foundation from which the USAF could develop both strategic and tactical airlift.

Well before America's entrance into the Second World War, the USAAF had developed into the strategic air arm of the United States. Its doctrine was untested and placed considerable emphasis on long-range strategic bombing. When it became apparent the United States would become an active participant in the war, the USAAF's Air Staff planners failed to recognize the need for adequate air transport operations. The hasty creation of Ferry Command focused solely on the delivery of aircraft purchased under

¹Department of Defense, *Mobility Capabilities and Requirements Study 2016: Executive Summary* (Washington, DC: Department of Defense, 2009), 4.

lend-lease to America's allies. The concept of air supply and sustaining ground and air forces for significant periods had not yet been considered.

However, the activation of the Ferry Command represented an acceptance by the Air Staff that USAAF needed to distribute resources around the world as America's allies requested more aid. This meant increasing the responsibility of the Ferry Command and seeking outside assistance from civilian airline operations and their executives, who had already pioneered air travel across the oceans and the continental United States. The USAAF, under the increase pressure of global warfare, absorbed the services of the commercial airlines and drew on their expertise in the delivery of passengers and materials to all American theaters of war.²

The Theaters of War and Allied Policy

The War Department divided the war into four distinct theaters: the European, the Pacific, the Mediterranean and Middle East, and the CBI. Each theater represented distinct challenges. The European theater was the whole of the continent of Europe, and the Allies used the British Isles to prepare and launch the offensives to free countries occupied by Nazi Germany. The Pacific Theater was more complex. An Allied victory over Japan required attacking the Japanese home islands from distant bases. The vastness of the Pacific Ocean and the lack of basing options prevented an easy solution. The remaining theaters, the Middle East and Mediterranean Theaters and the CBI, became theaters that supported the progress for the larger European and Pacific theaters. Of these areas of operation, each under a unique command structure, the European Theater

²Wesley Craven and James Cate, *Services around the World*, The Army Air Forces in World War II 7 (Chicago: University of Chicago Press, 1958), 15-19.

received a higher priority and the greatest amount of attention from the United States, the British, and the Soviets.

The Administration of President Franklin D. Roosevelt did not make this decision in the absence of good public policy. American national interests were closely tied to that of their European allies. With the United States having a population based largely on European ancestry and commerce tied to the economic strength of the continent, the action to make Europe a priority over the Pacific made good political sense. However, the American public, witnessing the events on 7 December 1941, wanted vengeance for the attack on Pearl Harbor. Although the Roosevelt Administration would enter World War II placing the weight of effort in the European Theater, it needed to prove to its allies in the lesser theaters—and to the American public—that it remained committed to defeating Japan. This effort meant providing substantial lend-lease aid not only to Britain and the Soviet Union but to China as well.

The Americans were taking a monumental chance in supporting China. China and Japan were already at war fighting the second Sino-Japanese War, during which Japan invaded and occupied large portions of mainland. The two nations had been fighting off and on since 1937. Moreover, China was in the midst of its own great internal struggle between the Kuomintang (KMT), led by Generalissimo Chiang Kai-shek, and the Chinese Communist Party (CCP), led by Mao Tse Tung. The KMT and CCP were at odds over their ideologies, but with the start of World War II, they would put their

differences aside, sign a truce with one another, and join the side of the Allies in the war against Japan.³

The United States saw great strategic value in having China as an ally against Japan. With the Europe-first strategy and with American forces fighting desperate battles in the Philippines and on Wake Island in early 1942, the necessary combat power was not available to take the fight to the Japanese. The Americans needed the Chinese to provide the necessary pressure against the Imperial Japanese Army for as long as possible, until the United States could establish a positive footing in the Pacific and pursue a strategy that would ultimately defeat Japan. Furthermore, China represented basing options for long-range bombers that would be able to conduct attacks against the Japanese home islands. This plan became known as the “China Policy” and drove the American strategic decisions that would shape the CBI.⁴

Strategic Decisions and the Importance of Burma

While the Americans struggled with the situation in the Philippines during the outbreak of the war, the other Allies, specifically the British, faced daunting challenges of their own in the Far East. Japan dealt Britain a crushing defeat in Singapore and set out to launch its next effort against Burma. To the Japanese, the capture of Burma was a

³Barbara Tuchman, *Stilwell and the American Experience in China, 1911-1945* (New York: Grove Press, 1971), 2.

⁴Wesley Craven and James Cate, *The Pacific: Guadalcanal to Saipan August 1942 to July 1944*, *The Army Air Forces in World War II* 4 (Chicago, IL: University of Chicago Press, 1956), 405.

necessary element for Chinese capitulation. By closing the Burma Road, Japan could effectively strangle China.⁵

Japan successfully cut off most of the supply routes to China on the eastern coast, and the Japanese knew they could bring about the culmination of the Chinese forces by cutting off the remaining supply lines. With France signing the armistice with Germany on 22 June 1940, Japan met little resistance from French Indochina and proceeded to close the railway out of Haiphong to China.⁶ This action left the Burma Road closure as the next key objective. Closing it would totally seal off the Chinese from the rest of the world and perhaps bring the Chinese to negotiate for terms.

Burma is located between India and Thailand and is no bigger than France. Long and narrow, the country has four major rivers—the Chindwin, Irrawaddy, Salween, and the Sittang—each running north to south. Largely dense jungle, the country has deltas to the south between Patheingyi and Pyawbwe leading to the capital city of Rangoon.⁷

With few roads for automobiles, most commerce travelled by boat up and down the Irrawaddy and the Salween Rivers. Existing roads did not connect the major cities. Therefore, the populace relied heavily on river ferry and two railroads that led out of Rangoon. The Burma Road—a collection of trails, roads, and rails—connected China to its last seaport in Rangoon. The Burma Road stretched for over 750 miles through hilly

⁵John Costello, *The Pacific War 1941-1945* (New York: Quill, 1981), 93.

⁶*Ibid.*, 71.

⁷Louis Allen, *Burma, The Longest War 1941-45* (London: J. M. Dent and Sons, 1984), 7.

terrain connecting areas such as Lashio and Mandalay, Burma, before it crossed into China (figure 1).⁸

In January 1942, the Japanese invaded Burma (figure 2) and summarily defeated the American, British, and Burmese forces. By May 1942, the Japanese completed their conquest of Burma and achieved a critical strategic objective. As the Japanese forces pushed the Allies out of Burma, the last ground route closed behind them, leaving China dependent on air supply for ammunition, spare parts, and gasoline.

With China cut off from the rest of world, the Americans and British debated the best course of action to supply their embattled ally. With a Europe-first grand strategy, the situation looked bleak for Chiang Kai-shek and his Nationalist Chinese Army. In his favor, American interest desperately sought to keep his force in the war against Japan. Because of his large army and vast countryside, the Americans could expect the Chinese to delay the Japanese for as long as necessary, as long as they were well supplied.

⁸Ibid.



Figure 1. Burma Road

Source: Clayton Newell, *The U.S. Army Campaigns of World War II, Burma 1942* (Washington, DC: Center of Military History, 1995), 7.

The British had very different ideas regarding the intrinsic value of China to the war effort. Chinese political and social involvement in both Burma and India made British officials leery of placing such trust with Chiang Kai-shek's government. Instead, Churchill expected to provide China with limited resources and focus on the defense of India and Ceylon.⁹ The Allies had decisions to make regarding the viability of keeping

⁹Tuchman, *Stilwell and the American Experience in China 1941-1945*, 341.

China an ally in the war against Japan and concerning how they would go about supplying the Chinese with necessary lend-lease aid.

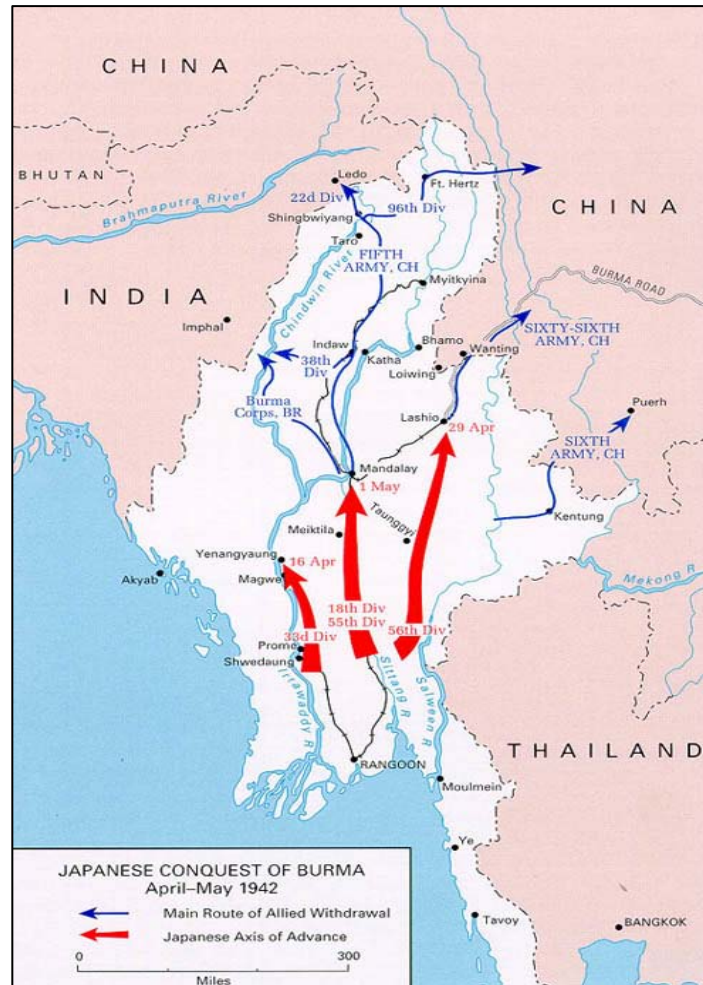


Figure 2. Japanese Conquest of Burma April-May 1942

Source: Clayton Newell, *The U.S. Army Campaigns of World War II, Burma 1942* (Washington, DC: Center of Military History, 1995), 20.

Thesis Statement

The USAAF responded to the requirement to keep China engaged against Japan by conducting two distinct air supply operations: a tactical air supply mission to Burma and a strategic air supply effort over the Himalayas to China. The tactical air supply effort to Burma supported offensive combat operations and the construction of the Ledo Road while the Hump airlift directly contributed to the American strategic objective. Despite Stilwell's stubborn commitment to the Ledo Road as the main effort to supply the Chinese and the necessary use of tactical air supply to support this and other ground operations in Burma, ultimately, the key contribution to the success of keeping China in the war against Japan was the strategic air supply missions over the Hump.

Primary and Secondary Research Questions

The American strategy in the Far East required keeping China as a viable ally against the Japanese. Doing so required increasing the pace and quantity at which the American Military Mission to China (AMMISCA) distributed lend-lease aid to its new ally, but the closure of the Burma Road made such a venture almost impossible. The War Department understood the significance of the Burma situation and ordered the opening of a new theater of war, the CBI. General George C. Marshall selected Lieutenant General Joseph Stilwell to command the CBI and directed him to keep China in the war. Given such requirements, two distinct air supply operations developed between 1942 and 1945: the air supply for Burma and the Hump airlift effort to China. This thesis reviews how the operational airlift efforts within the CBI supported both efforts and examines the challenges, processes, and development of air supply. The fundamental question

associated with this effort concerns how USAAF responded to seemingly competing air supply requirements in the CBI Theater in order to keep China in the war against Japan.

Historiography

Historians such as Wesley Craven, Charles Romanus, and Leo Daugherty have addressed the importance of the Ledo Road and Hump operations in their studies of the CBI, yet no one has adequately assessed the relative importance of the tactical air supply in Burma and the strategic effort associated with Hump missions in keeping China in the war against Japan. This thesis addresses those issues more fully and shows how much more significant the strategic lift efforts were to achieving U.S. strategic objectives with China than those associated with tactical support to ground campaigns in Burma and the construction of the Ledo Road. Tactical air supply was needed, but in the end it was strategic lift that sustained Chinese forces between 1942 and 1945.

CHAPTER 2

THE ORGANIZATION AND CHALLENGES FOR AIR SUPPLY IN THE CHINA-BURMA-INDIA THEATER

The CBI was the Americans most distinctive and most distant theater of war during World War II. It sat at the end of a 12,000-mile-long supply line and saw its resources constantly diverted to other theaters in crisis throughout the war.¹⁰ Superior Japanese combat power compounded the theater's physical and topographic challenges. When the American forces arrived, they found the small American Volunteer Group (AVG) led by Claire Chennault to be the only means to contest Japanese air superiority. Furthermore, the Japanese severed the line of communication (LOC) that supplied China and its small air force. Without that critical supply line, Lieutenant General Joseph Stilwell's mission to China would be over before it began.

To prevent the total logistical strangulation of the Chinese, the Allies resorted to the use of air supply routes over the Himalayas to provide the necessary combat support. For air supply to be effective, it needed the capacity and capability to meet the Chinese supply needs. Neither was available for the Americans at the start of the war. In addition, the effectiveness of air supply required protection from Japanese fighters and a simplified command and control (C2) structure.

The United States had had a military presence in China well before World War II, and it assisted with the development of the Chinese army and the distribution of

¹⁰Herbert Weaver and Marvin A. Rapp, *The Tenth Air Force 1942* (Washington, DC: Air Force Historical Research Agency, 12 (unclassified, originally published 1944).

American Lend Lease Act materiel. Under the AMMISCA, the Americans expected to develop and sustain both the Chinese army and air force.

The Origins of Airpower in the CBI

Before the war began, the Chinese air force was grossly under developed and proved to be of little consequence to the Japanese Army Air Force.¹¹ This situation continued until Chennault and the AVG's arrival in July 1941. As an ad hoc assembly of ex-United States military pilots, the AVG revitalized Chinese air combat power. Charged with the responsibility of providing air support to the Chinese forces, the men of the AVG attempted to deprive the Japanese Army Air Force of air superiority over China and Northern Burma.¹² With the advent of the Curtis-Wright P-40 Tomahawk (figure 3) and Chennault's pursuit tactics, the Chinese air force reversed its dismal performance and eventually held its own against the Japanese Imperial Army Air Force's Nakajima Ki-43 Hayabusa fighter (figure 4).¹³

Like the Chinese army, the AVG relied on the Burma Road for its sustenance. Its closure represented a major setback and jeopardized its existence. Without it, the AVG had to rely on the China National Air Corporation (CNAC) DC-3s (figure 5) to provide support. Pan American Airways owned the CNAC and it operated scheduled air service

¹¹Weaver and Rapp, *Tenth Air Force 1942*, 4.

¹²The AVG was comprised of 62 U.S. Navy/USMC aviators and 38 U.S. Army Air Force pilots.

¹³The AVG's original order of 100 aircraft consisted of the Curtis-Wright H-75 airframe, an early version of the P-40B destined for U.S. Army Air Force service. The aircraft was exported to both China and Great Britain. The AVG would also take delivery of the P-40E, a much-improved aircraft fitted with a larger engine, larger caliber wing guns, and bomb racks.

in the Far East. It became the American de facto air supply operation in the theater as the USAAF processed aircraft and aircrews.¹⁴ Chennault's AVG assumed responsibility for protecting the air routes pioneered by the CNAC and provided air cover for the newly arrived American forces in the theater.



Figure 3. Curtis-Wright P-40B Tomahawk in Chinese Air Force Markings
Source: National Museum of the United States Air Force, <http://www.nationalmuseum.af.mil/factsheets/factsheet.asp?id=478> (accessed 10 November 2010).



Figure 4. Japanese Army Air Force Nakajima Ki-43
Source: WWII Imperial Japanese Army Aircraft Photos, s.v. "Nakajima Ki-43," <http://www.ijaafphotos.com/jbwki437.htm> (accessed 22 November 2010).

The first place USAAF Air Staff planners turned to was the northern coast of Australia, where the Far East Air Force (the newly formed Fifth Air Force) deployed

¹⁴Weaver and Rapp, *Tenth Air Force 1942*, 66-7.

after withdrawing from the Philippines on 24 December 1941.¹⁵ The Air Staff explored the possibilities of moving this air force from Australia to India in order to project combat power against the Japanese occupied territories. Although the B-17 (figure 6) did not have the range to hit targets on the Japanese home islands from Australia, it could attack targets in occupied China from bases in India.



Figure 5. Chinese National Air Corporation DC-3

Source: China National Air Corporation Society Imagery Collection, <http://www.cnac.org/plane006dc3.jpg> (accessed 8 August 2010).

Finally, the Air Staff decided to establish the Tenth Air Force in India with assets gathered en route to the Philippines and Australia.¹⁶ Furthermore, the War Department ordered the induction of the AVG into the USAAF in an effort to bolster the airpower situation in the theater, a move that the AVG flyers resisted. Both the AVG leader and its

¹⁵Air Force Historical Studies Office, "U.S. Army Air Forces in World War II: Combat Chronology, December 1941," Air Force Historical Studies Office, <http://www.airforcehistory.hq.af.mil/PopTopics/chron/41dec.htm> (accessed 10 November 2010).

¹⁶Weaver and Rapp, *Tenth Air Force 1942*, 17.

men resented the fact that the USAAF called for their return to service.¹⁷ Though ex-military, many of the AVG flyers had no desire to return to the life of American service members. Chennault's reluctance to integrate with the USAAF centered on the problems associated with command and control.



Figure 6. Boeing B-17E

Source: National Museum of the United States Air Force, Boeing B-17E Factsheet, <http://www.nationalmuseum.af.mil/shared/media/photodb/photos/060515-F-1234S-026.jpg> (accessed 14 November 2010).

The Organization of the Air Forces

China Air Task Force

Chennault did not want to be part of an organization in chaos. The organization of the CBI air forces was under constant stress and change. The chaos resulted from genuine efforts to simplify and increase the efficiency of the air supply effort. The command-and-control (C2) and mission execution challenge remained paramount. How was the air effort in the CBI going to supply an entire nation by air, given the severe challenges

¹⁷Daniel Ford, *Flying Tigers: Claire Chennault and His American Volunteers, 1941-1942*, rev. ed. (Washington, DC: HarperCollins/Smithsonian Books, 2007), 175.

associated with the theater? From a strategic organizational standpoint, the CBI was an American theater of war, but it was subordinate to the larger British command known as the Southeast Asia Command (SEAC). The supreme allied commander was British, a fact that complicated the strategic nature of the overall mission because the Americans' China Policy was not congruent with British strategic interests.¹⁸ This political distinction did not affect the need for airlift. Air Supply operations supported both the SEAC and the CBI, despite the lack of available assets.

As the military situation developed, the USAAF added the Tenth Air Force to the theater air order of battle. With the addition of this new organization, the USAAF divided the CBI into two sectors: the India-Burma Sector (IBS) and the China Air Task Force (CATF).¹⁹ This division of sectors helped determine the areas of responsibilities for the two air forces but did little to assist the air supply situation. In fact, it only made matters worse because the two commands competed for resources. This competition for resources became fiercer once the AVG became CATF. The struggle did not end until the CATF became the Fourteenth Air Force on 10 March 1943.²⁰

Furthermore, the USAAF leadership was unimpressed with how the CBI air officers led the air supply effort and, subsequently, removed the Ferry Command from

¹⁸Max Hastings, *Winston's War: Churchill, 1940-1945* (New York: Knopf, 2010), 303.

¹⁹Wesley Craven and James Cate, *The Pacific: Matterhorn to Nagasaki June 1944 to August 1945*, *The Army Air Forces in World War II* 5 (Chicago: University of Chicago Press, 1956), 180.

²⁰Weaver, Herbert and Marvin A. Rapp, *The Fourteenth Air Force to 1 October 1943* (Washington, DC: Air Force Historical Research Agency, 2 (unclassified, originally published 1945).

the Tenth Air Force and placed it under the new ATC, thereby creating the India China Wing (ICW) of the ATC. The ICW concentrated exclusively on the Hump Airlift effort to China and reported directly to the USAAF headquarters in Washington, DC. In essence, the theater commander, Stilwell, was losing control of his theater's air supply system. The USAAF Air Staff planners later assigned a Troop Carrier Squadron to the theater to provide Stilwell with necessary air supply. The months that followed saw a unique transformation in the organization of the air forces, especially with regards to the CATF and the Tenth Air Force.

The CATF was formed on 4 July 1942 and absorbed the remnants of the AVG, creating the 23d Fighter Group.²¹ Chennault remained the commander and conducted air combat missions against the Japanese forces in occupied China. As commander, Chennault maintained sole tasking authority, but operational control fell to the Tenth Air Force (Appendix A).²²

To conduct his operations properly, Chennault needed resources that were hard to come by. To get those supplies, Chennault's fighter-centric command needed to rely on outside means of support, specifically from the CNAC and the Tenth Air Force's Ferry Command. Chennault, a previous Air Corps Tactical School instructor and airpower advocate, believed that, if properly supplied, the CATF could deliver a decisive blow to the Japanese and possibly end the Japanese occupation of China.²³ He successfully convinced Chiang Kai-shek of his plans but failed to convince Stilwell. The latter

²¹Donavan Webster, *The Burma Road* (New York: HarperCollins, 2003), 65.

²²Tuchman, *Stilwell and the American Experience in China*, 309.

²³*Ibid.*, 336-37.

controlled lend-lease aid disbursement from India to China. Essentially, Chennault needed dedicated airlift, but the Tenth Air Force's Ferry Command was unable to commit the necessary assets to support both the CATF and the Chinese army. Stilwell's staff anticipated that the Chinese forces (the CATF included) needed 65,000 tons per month in munitions, fuel, and spare parts.²⁴ The Burma Road was needed to assist in the delivery of the necessary tonnage, but it disappeared after May 1942.

Tenth Air Force

While the CATF was being formed, the War Department dispatched Major General Lewis H. Brereton to India to establish the Tenth Air Force and provide air supply and bomber operations. His previous command had been in the Philippines as the Far East Air Force commander, and now he went to the CBI to keep the supply routes between India and China open and, if ordered, to conduct offensive operations against Japan.²⁵ He arrived in February 1942 with 10 aircraft and immediately established his command as an effective fighting force. The Tenth Air Force, like the CATF, fell under Stilwell's command and assumed responsibility for the IBS.²⁶ It consisted of the 51st Pursuit Group, 51st Airbase Group; the 7th Bombardment Group (Heavy); and the Ferry

²⁴Charles Romanus and Riley Sunderland, *Stilwell's Command Problems*, United States Army in World War II, China-India-Burma Theater 2 (Washington, DC: Department of the Army, 1956), 10.

²⁵Charles Romanus and Riley Sunderland, *Stilwell's Mission to China*, United States Army in World War II, China-India-Burma Theater 1 (Washington, DC: Department of the Army, 1953), 78-9.

²⁶*Ibid.*

Command, which would provide the air transports needed to supply both the IBS and the CATF.

Brereton's command was in a predicament. It arrived in India to find itself facing a belligerent indigenous population and inadequate infrastructure.²⁷ It received very few resources from CONUS, and the Air Staff instructed the new command to survive off the local economy. When Brereton arrived in India, he had only a small staff of officers and enlisted men and an even smaller complement of aircraft. He had to deal with the indigenous population and secure reverse lend-lease aid, a process in which aid promised to the American Allies was retaken to support American combat operations.²⁸ Unfortunately for Brereton, more pressing issues in North Africa required his assistance, and he was sent to Egypt to support British operations. His departure left the Tenth Air Force in the hands of Brigadier General Earl Naiden, his Chief of Staff.

The newly minted Tenth Air Force still lacked combat power, but it was to receive a flight of B-24s (figure 7), sixteen B-25s (figure 8), and thirty-five DC-3s before the end of May 1942.²⁹ Before Brereton went to North Africa, he was in the process of rearranging the command. The original basing options placed the Ferry Command at Bangalore, India, a city far removed from the ports and ill equipped to handle logistics. Instead, he moved the Ferry Command Headquarters to Karachi, a port city that was safe

²⁷Weaver and Rapp, *Tenth Air Force 1942*, 1.

²⁸*Ibid.*

²⁹The 16 B-25Bs were the aircraft of Doolittle Raiders; ultimately 15 aircraft were destroyed and one airplane interned at Vladivostok; all but two of the crews were recovered.

from enemy air attack, and he moved his headquarters to be closer to the SEAC Headquarters in New Delhi to better coordinate air operations with the RAF.³⁰

As part of the Tenth Air Force's air supply mission, the Ferry Command assumed the role of air transport service to both the IBS and the CATF and found itself in the midst of a great argument regarding distribution of resources between the CATF and the parent command, the Tenth Air Force. Chennault argued that, if he had enough resources, he could effectively end the war. Brereton argued his operations were in the early stages and needed the resources just to get started. Moreover, the British constantly requested air supply assistance as they sought to keep Fort Hertz, a forward outpost in Northern Burma, supplied.



Figure 7. Consolidated B-24 heavy bomber

Source: National Museum of United States Air Force, <http://www.nationalmuseum.af.mil/shared/media/photodb/photos/060601-F-1234S-003.jpg> (accessed 10 November 2010).

³⁰Romanus and Sunderland, *Stilwell's Mission to China*, 79.

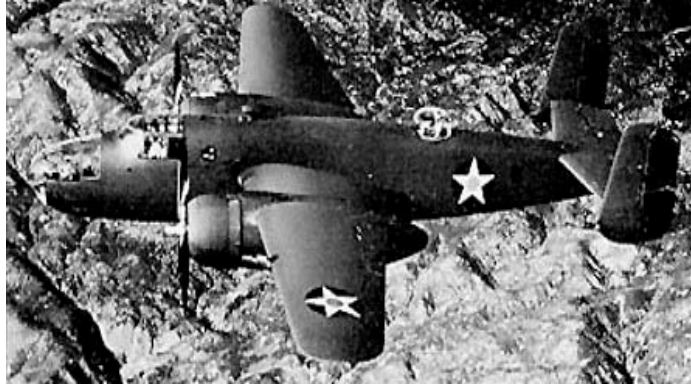


Figure 8. Mitchell B-25 medium bomber

Source: National Museum of the United States Air Force, <http://www.nationalmuseum.af.mil/shared/media/photodb/photos/061215-F-1234S-004.jpg> (accessed 10 November 2010).

Ferry Command simply fell behind schedule. In November, Brigadier General Naiden reported that he could fly only 25 air transports eastward to China because of the lack of airbases in the Assam Valley.³¹ The frequency and number of air supply missions was one concern. Whether or not the airplanes and aircrews were being used properly became the greatest concern to supply operations. The USAAF Air Staff began preparing for creating a new command, ATC, to handle the air supply effort to China.³²

Services of Supply Command

One of the greatest challenges to conducting air supply in the CBI revolved around the lack of capacity and capability. Bolstering the air transports in theater made little sense if the supplies were not available for distribution and if the airbases were not constructed. Stilwell echoed this concern when he expressed his thoughts about the air

³¹Craven and Cate, *Services Around the World*, 118.

³²*Ibid.*

supply situation to Madame Chiang Kai-shek.³³ When the Tenth Air Force arrived in India, the Services of Supply (SOS) Command accompanied it. The SOS served as the chief procurer and distributor of material across the region. On its arrival in February 1942, there were no stocks for combat power. The USAAF arrived in India to find a disjointed distribution infrastructure designed to support British economic interests rather than military efficiency. In April 1942, the command assumed the responsibility of all rail, seaport, and airheads into and out of India. SOS's mission was to supply all American forces in the region.³⁴ SOS received, warehoused, assembled, and transported lend-lease supplies to China.

The SOS had access to India's military resources; however, much of those resources supported Middle East requirements.³⁵ The SOS commander, Brigadier General Raymond Wheeler, could request host nation support, but his requests were secondary to British and Indian requirements. Like Brereton, Wheeler faced challenges in India. The most unique challenge was a political battle between Mahatma Gandhi and the Government of India, exacerbating the supply situation. Gandhi incited the people to rise in protest against British colonialism and saw the American presence in India as supporting the British.³⁶ Merchants who agreed with Gandhi's philosophy felt no allegiance to the British and they saw no obligation to assist the Americans.³⁷ With

³³Tuchman, *Stilwell and the American Experience in China*, 311.

³⁴*Ibid.*

³⁵*Ibid.*

³⁶*Ibid.*, 259.

³⁷*Ibid.*, 311.

Burma largely occupied by the Japanese, however, the Indian government and British military forces shifted their attention from Gandhi to the defense of India. The British and Indian officials needed the finite resources for their own security.³⁸ The SOS's internal challenges reflected the multitude of challenges for CBI air supply. It deployed to a region in the world that had very little modern logistical capability and was expected to do the impossible, supply a theater of war at the far reaches of the American supply chain. With these challenges, the next major obstacle arose with developing the capability to deliver the supplies to China and to a new air force, the Fourteenth Air Force.

Fourteenth Air Force

As the commander of the CATF, Chennault successfully argued for increased responsibility, and General George C. Marshall awarded him with the creation of the Fourteenth Air Force. The assignment was politically motivated.³⁹ Chennault's persistent assertion of his perceived proper use of the CATF with Stilwell caused great anxiety for the Air Staff. Chennault needed the CATF to become a numbered air force, not a task force, in order to prove his theory of airpower. Realistically, the CATF should have remained a task force. Becoming a numbered air force placed greater strain on an already stressed SOS. The SOS was struggling to meet CATF requirements.⁴⁰ With the creation of the Fourteenth Air Force, it would need to sustain a larger force consisting of bombers and multiple pursuit aircraft types.

³⁸Ibid.

³⁹Weaver and Rapp, *Fourteenth Air Force*, 7.

⁴⁰Tuchman, *Stilwell and the American Experience in China*, 309.

Chennault expected more and believed that the leadership in India was stalling his efforts for success.⁴¹ He insisted on receiving the proper resources and, subsequently, being made the main effort. He contended he could defeat the Japanese by disrupting the Japanese flow of war materiel through the South China seas. In a larger context, Chennault discussed the Pacific war strategy with Stilwell in terms of creating a Chinese ground force capable of conducting action against the Japanese-occupied areas, neutralizing Japanese air efforts in Burma and Indochina and thereby relieving the Japanese threat to India and the Hump air routes and supplying a successful offensive to inspire all Allied forces.⁴² Chennault requested 500 combat planes and 100 air transports, plus the complete control of the air operations over China. If Stilwell fulfilled his request, he could attain all the aforementioned objectives.⁴³ Stilwell was not totally convinced that airpower could achieve such a victory. His staff began constructing preliminary plans for retaking Burma in order to reopen the Burma Road and to reestablish the LOCs between India and China.

Chennault, on the other hand, possessed powerful political relationships with both President Roosevelt and with Generalissimo Chiang Kai-shek. In his letter to both leaders, he expressed the validity of his plan. Chiang Kai-shek saw merits in Chennault's thesis and realized that airpower would require no Chinese effort, allowing him to preserve his teetering seat of power.⁴⁴ President Roosevelt, equally enamored with the

⁴¹Weaver and Rapp, *Fourteenth Air Force*, 4.

⁴²Tuchman, *Stilwell and the American Experience in China*, 310.

⁴³*Ibid.*

⁴⁴*Ibid.*

idea, pushed Marshall and the Air Staff to create the air force Chennault requested.⁴⁵ On 10 March 1943, the Fourteenth Air Force replaced the CATF, with Chennault as the commanding general.

Eventually, Hump airlift efforts would need to increase support to the new command.⁴⁶ As the Allies entered 1944, the confusion over the organization of the air forces remained a problem. The air war over the CBI was split between the two American numbered air forces and the two major commands that oversaw them (Appendix A).

The British expected to combine the air operations in the theater as they assumed the lead role with the position of supreme allied commander. From the American perspective, American airpower would remain separate but would assist the British when necessary.⁴⁷ The Tenth Air Force would liaise with the British Eastern Air Command. However, to keep the staff a combined staff of American and British general officers, Major General George E. Stratemeyer was named both the commander of the Army Air Forces, India-Burma Sector of the CBI, and the Commanding General Eastern Air Command under the Allied Air Forces Southeast Asia command, commanded by British General Sir Richard Peirse. Stratemeyer appeared to answer to multiple commanders (figure 9), and he still did not have complete control of the air war over the CBI.

⁴⁵Weaver and Rapp, *Fourteenth Air Force*, 5.

⁴⁶*Ibid.*

⁴⁷Weaver and Rapp, *Tenth Air Force 1942*, 76.

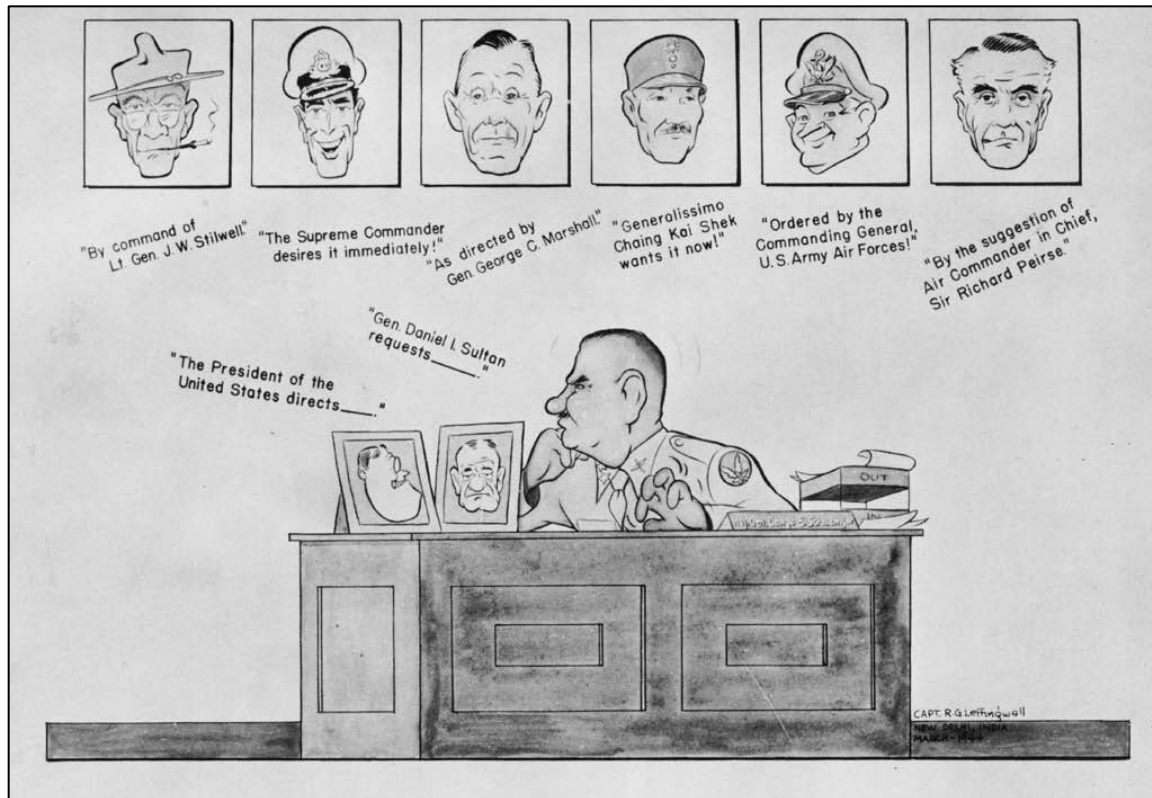


Figure 9. Stratemeyer's Bosses

Source: Wesley Craven and James Cate, *The Pacific: Guadalcanal to Saipan August 1942 to July 1944*, The Army Air Forces in World War II 4 (Chicago: University of Chicago Press, 1948), 438.

The Fourteenth Air Force did not report directly to Stratemeyer. Instead, the Fourteenth Air Force, still commanded by Chennault (Appendix A), became an equal of the AAF's IBS. Stilwell remained the senior American commander until Marshall removed him on 24 October 1944. Lieutenant General Albert C. Wedemeyer replaced him.⁴⁸ The changes only highlighted the tensions that were present at the strategic level in the CBI.

⁴⁸Charles Romanus and Riley Sunderland, *Time Runs Out in CBI*, United States Army in World War II, The China-Burma-India Theater 3 (Washington, DC: Department of the Army, 1959), 15.

Other Challenges to Air Supply in the CBI

The challenges associated with the C2 were impressive but not insurmountable. With some work, the planners could solve the organization problem. Perhaps the greatest challenges to the air supply mission arose from the weather, terrain, and enemy air activity.

The weather in the CBI was some of the most dangerous any USAAF aircrews had ever seen. The high temperatures and excessive humidity affected man and machine alike. Areas in the region received in excess of 200 inches of rainfall per year, precipitating diseases like malaria. For most of the year (typically from June to October), the monsoons cloaked the theater in low cloud ceilings and caused poor flight visibility. Heavy rains and strong winds made living and working conditions unbearable. The dirt airfields and roads typically washed away during these monsoons, requiring constant repair and reconstruction. The Irrawaddy and Salween Rivers became torrents and proved impassable, limiting combat operations during the monsoon season. Thus, the planners organized most operations to coincide with the dry season (November to May). Any operations started late in the dry season needed to conclude before the coming of the monsoons.

Air supply operations, on the contrary, operated year round. Air operations stopped only when conditions such as thunderstorms prevented safe passage. Unfortunately, for many aircrews, the discovery of such storms proved fatal. In such instances, the aircrews had to ride out such storms and hope they could make it to the other side. Penetrating such storms possibly meant taking the aircraft beyond its

structural limits, enduring violent up and downdrafts over an unforgiving terrain of mountains and dense jungle (figure 10).

The effects of weather and terrain were a dangerous combination. The terrain was as unique to the theater as the weather. The aircrews were flying over what many figuratively called the top of the world—the Himalaya Mountains.⁴⁹ The Himalayas range from 9,800 feet to 29,035 feet over a large expanse of land extending from Afghanistan to China. The main Himalaya range runs west to east, from the Indus river valley to the Brahmaputra river valley, forming an arc 2,400 km (1,491 mi) long. The terrain varies in width from 400 km (249 mi) in the western Kashmir-Xinjiang region to 150 km (93 mi) in the eastern Tibet-Arunachal Pradesh region. Low river valleys riddle the area below.⁵⁰

⁴⁹National Public Radio, “Everest--To the top of the World,” <http://www.npr.org/templates/story/story.php?storyId=1243771> (accessed 4 December 2010).

⁵⁰Columbia Electronic Encyclopedia, “Himalayas,” Reference.com, <http://www.reference.com/browse/Himalayas> (accessed 9 December 2010).



Figure 10. Terrain in the Kuming Area

Source: Charles Romanus and Riley Sunderland, *Time Runs Out in CBI*, United States Army in World War II, The China-Burma-India Theater 3 (Washington, DC: Department of the Army, 1959), 11.

The aircrews of the Hump negotiated an area of the Himalayas called Samsung Range, whose mountaintops range from 12,000 feet to 19,000 feet (figure 11).⁵¹

⁵¹Craven and Cate, *Services Around the World*, 115.

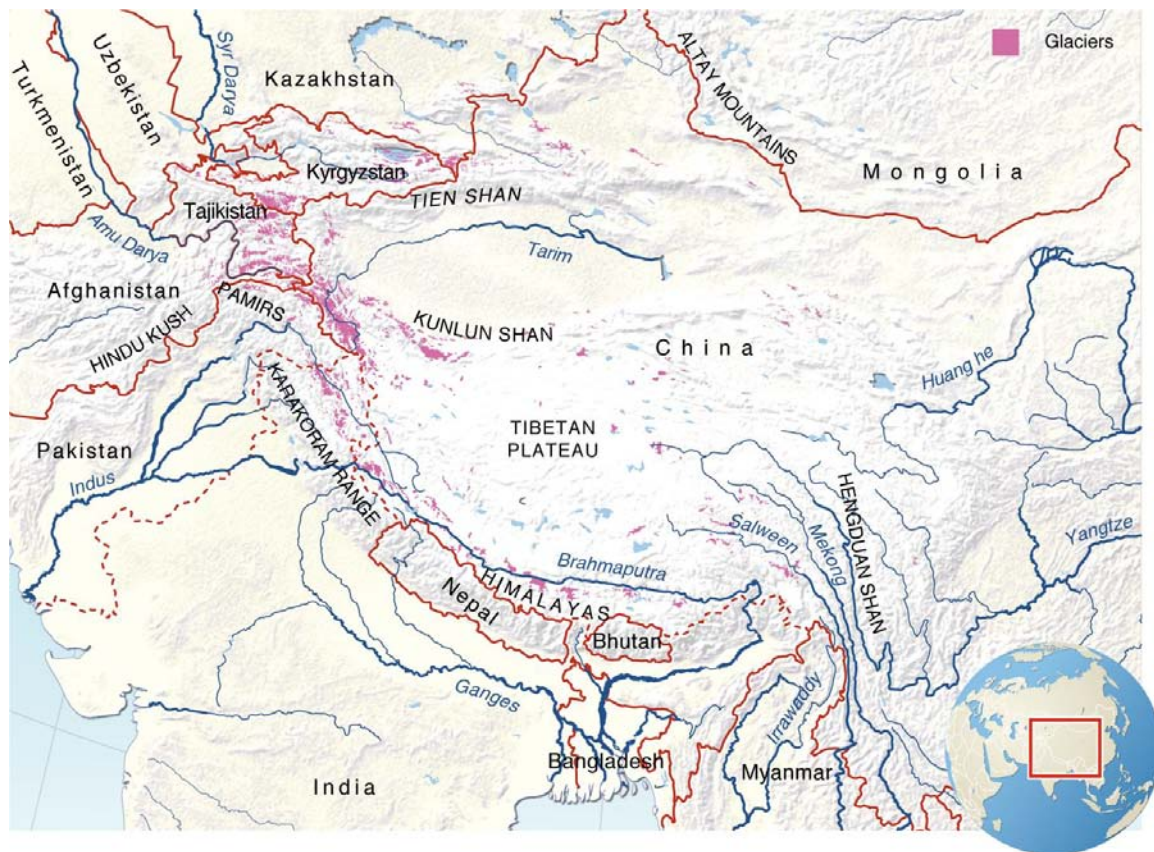


Figure 11. The Himalayas

Source: Himalaya Maps, http://daniellemeitiv.files.wordpress.com/2009/08/greater_himalayan_region_map.jpg (accessed 15 November 2010).

The weather and terrain were not the only problems encountered by the aircrews of the CBI; an additional threat came from the Japanese Army Air Force fighters. The Japanese Army Air Force aircraft operated unabated and influenced Hump airlift operations and the combat cargo operations over Burma. In early 1941, the Japanese Army Air Force controlled the air over Burma and most of China, forcing air supply operations to be conducted largely at night. In mid-1941, the AVG provided the only threat to Japanese air supremacy. Even though the AVG never fielded enough combat aircraft to pose a significant threat to Japanese air operations, it still represented a threat

that the Japanese had to deal with. Chennault's AVG provided air cover for both Stilwell's ground forces as well as air cover for the CNAC and the Tenth Air Force's Ferry Command. Unfortunately, the AVG never achieved its full combat strength and was unable to provide adequate air cover to both the CNAC and the additional USAAF assets.⁵² As the situation in Burma became desperate, the AVG fighter squadrons were moved from Burma to bases in China, further enhancing the Japanese air superiority position.

Newly created Japanese airfields in southern Burma allowed Japanese air attacks against Allied positions in India and in China. The airfield at Myitkyina became a vital air hub for the Japanese, just as it had been for the Allies. From Myitkyina, Japanese combat aircraft forced early Hump operations to fly the northern route over the taller mountains.

Summary

The challenges to providing air supply in the CBI were extensive, ranging from the lack of airpower in the theater to the environmental impact presented by the region. The war's start would dictate how the Allies in the CBI would perceive air supply. They needed to build the capacity and capability to deliver the necessary materiel to China when the Burma Road closed in May 1942. Additionally, the air supply effort presented a unique command and control issue for the Americans because it was used to support two distinct operations in Burma and in China. From the start, it was clear that the USAAF could not do both and that the process for supplying the theater by air needed to be

⁵²Ford, *The Flying Tigers*, 238.

reconsidered. This chapter examined the challenges for air supply in the theater as they represented a point of departure for how the Air Staff planners perceived the mission of air supply.

CHAPTER 3

TACTICAL AIR SUPPLY IN BURMA

The situation in Burma required significant air supply. Japan's successful invasion and occupation of Burma in May 1942 effectively closed the Burma Road and left air supply as the only means to sustain the Chinese. Feeling the effects of defeat, Stilwell intended to retake Burma and reopen the Burma Road as soon as possible. His plans met with stiff resistance from the Chinese and the British. Both believed that Stilwell was too ambitious. The Allies were still recovering from their defeat in Burma and still trying to get a wartime footing in the theater. Instead, the British insisted on redirecting combat power to support the defense of India and Ceylon. The Chinese expected to see more combat action in China against the Japanese. Ultimately, Stilwell's plan would come to fruition, but not without sacrifices. The concept of air supply for Burma emphasized tactical support by direct delivery of materiel through airdrop, glider towing, and austere airfield operations. Additionally, the Burma air supply effort would require an increase in necessary resources to conduct such operations and strain the logistical infrastructure.

The Early Efforts of Air Supply

The significance of the Burma Road was unquestioned, but the problem of how to retake it or overcome its loss remained paramount. Its closure brought air supply to the forefront and forced the Allies to develop a doctrine of air sustainment. Doing so did not require much thought. ATC's concept simply stated that it would provide transportation by air of personnel, materiel, and mail for all War Department agencies except those

served by troop carrier units.⁵³ This stipulation indicated that ATC and Troop Carrier Command (TCC) were separate operations. ATC was responsible for strategic airlift operations and the TCC would transport troops and supplies directly into battle.⁵⁴

From the start of military action in the CBI, the Americans were at a disadvantage. The only combat power available was Chennault's AVG, and his small air force was ill equipped to handle an evacuation of wounded soldiers and refugees. Instead, the USAAF leased the CNAC DC-3s to conduct the evacuation efforts from Burma.

The evacuation of forces from Burma into India and China was undertaken in desperation, and aircrews did whatever they could to rescue as many persons as possible from the dangers presented by the Japanese. When the Tenth Air Force's Ferry Command arrived in the spring of 1942, it had seven aircraft (C-47s) and a cadre of 35 aircrew members.⁵⁵ On arrival, they suffered additional setbacks because their aircraft needed maintenance and repair.⁵⁶

Indeed, air supply was limited from the start and relied heavily on both the civil air service and available military aircraft. The Allies resorted to using heavy, medium, and light bombers to conduct transport operations because those aircraft were the only

⁵³Clayton Knight, *Lifeline in the Sky: The Story of the U.S. Military Air Transport Service* (New York: William Morrow, 1957), 27-45.

⁵⁴Marcella Thum, *Airlift! The Story of the Military Airlift Command* (New York: Dodd, Mead and Company, 1986), 13-20.

⁵⁵Army Air Force Statistical Digest Table 94-Airplanes on Hand in the China and India-Burma, By Type and Principal Model: Nov 1941 to Aug 1945 (Washington, DC: Department of the Army), 171.

⁵⁶Army Air Forces Historical Studies No. 34, *Army Air Forces in the War Against Japan 1941-1942*, 169.

ones available during the evacuation, with eight airplanes arriving in February 1942.⁵⁷ Brereton's departure to North Africa made matters worse. On 23 June 1942, the War Department directed Brereton to take his heavy bombers and a large portion of the Assam-Burma-China Airlines transport aircraft and personnel to North Africa and the Middle East to support the British efforts there.⁵⁸ North African air requirements superseded the delivery of air assets destined for China.⁵⁹ With no Curtis C-46 or Douglas C-47 aircraft available, the CNAC and Pan Am Clipper DC-3s were the only air transport assets available. Fortunately, a steady stream of aircraft began to arrive in June of 1942, and by the end of the summer, the Tenth Air Force's Ferry Command would have 53 C-47s.⁶⁰

President Roosevelt staunchly supported the Chinese. One of his greatest challenges involved keeping his promise to supply Chiang Kai-shek while assisting Great Britain. The most significant issue centered on access and use of lend-lease aid. Both Allies had significant needs. In the war against Japan, China represented a strategic option that the Americans could not ignore. China offered strategic bomber basing opportunities and, if adequately supplied, an army that could preoccupy the Imperial Japanese Army. Both options created valuable time for the allies to defeat Germany and then redirect their effort against Japan.⁶¹

⁵⁷Army Air Force Statistical Digest Table 94, 171.

⁵⁸Romanus and Sunderland, *Stillwell's Mission to China*, 157.

⁵⁹Army Air Forces Historical Studies No. 34, 169.

⁶⁰Army Air Force Statistical Digest Table 94, 171.

⁶¹Army Air Forces Historical Studies No. 34, 169.

The Allies' Strategy in the CBI

The Allies, however, had two diametrically opposed strategic interests. Great Britain sought to retake colonial territories lost to the Japanese and to protect its remaining colonies. The Japanese Far East campaigns were far more successful than anything the British or the Americans could accomplish. By June 1942, the Japanese had taken or were taking Singapore, Burma, and the Philippines, and they had planned future offensives against the Americans at Wake Island and Midway. The Japanese sought a decisive victory that would force the Americans to capitulate and to accept their position as the dominant power in East Asia.⁶² The Americans and the British feared that the Japanese had also set their sights on other British colonies, specifically India and Ceylon, in order to disrupt air routes over the Himalayas.⁶³ Therefore, the British attitude toward the Far East was to protect colonial holdings and to retake those lost to the Japanese. On the other hand, the Americans, torn between their two Allies, vowed to support both. President Roosevelt tied American national interest to Great Britain's survival and strongly believed support to Chiang Kai-shek's nationalist forces was necessary for a free and independent China. This stance meant supplying China long enough to keep it engaged against Japan.

With the fall of Burma, no other road or rail networks were available to supply the Chinese, and the Americans had no other choice but to assume they could keep China in the war through air supply. The previously mentioned problems with air force

⁶²Costello, *The Pacific War*, 71.

⁶³Army Air Forces Historical Studies 34, *Army Air Forces in the War Against Japan 1941-1942*, 169.

organization placed great strain on the execution of the air supply operations. The ground commanders of both the SEAC and the CBI argued over the best course of action to take with finite resources. Air supply efforts had to support China, but they were also needed to support the offensives for retaking Burma. These strategic and tactical requirements split the air supply effort between tactical support operations in Burma and strategic sustainment of the Chinese and the Fourteenth Air Force in China.

Before air supply played a major role in sustainment, it had conducted rescue operations in Burma. The Japanese invasion started on 12 December 1941 and ended in May 1942. The Burma Road officially closed in May 1942, but before it closed, it remained a main supply route (MSR) servicing key bases in Burma and connecting the Chinese to their share of the lend-lease aid. The Allies struggled immensely against the Japanese invasion force and left large stocks of lend-lease aid behind. Realizing the deteriorating conditions, the Allies planned and executed an evacuation to save as many soldiers as possible. Available air assets airlifted those unable to travel by foot out of the combat zone.

The Air Evacuation of Burma

Between February 1942 and May 1942, the CNAC, RAF 31 Transport Squadron, and USAAF performed meritoriously, evacuating the wounded soldiers and civilians to a British base in Dinjan, India, from locations such as Rangoon, Magwe, and Lashio, Burma.⁶⁴ The USAAF contributed by airlifting a battalion of British troops (456 men) into Magwe Airfield in Burma and evacuated 426 women and children to India using

⁶⁴Joe G. Taylor, *Air Supply in the Burma Campaign* (Maxwell AFB, AL: USAF Historical Research Division, 1957), 10.

heavy bombers.⁶⁵ The action was unprecedented. The newly arrived Tenth Air Force arrived in theater without any air transports, and with few targets ever identified for attack, the Tenth Air Force's 10 B-17 bombers supported the war effort wherever possible.⁶⁶

The chief task was the evacuation effort of wounded troops and civilians.⁶⁷ The Allied ground commanders expected the remaining soldiers to exit Burma by foot⁶⁸ because enough aircraft to airlift all the soldiers and their equipment were simply not available. As the Japanese advanced through southern Burma, the cities of Rangoon and Magwe fell, eliminating the Allies' access to those airfields. Myitkyina became the main aerial evacuation point, precipitating the movement of over 8,616 persons and 2,600 wounded soldiers.⁶⁹ To make this evacuation happen, the crews made three round-trips a day between Myitkyina and Dinjan.⁷⁰ The effort extended over a two-week period from 12 April 1942 to 2 May 1942 but came to an abrupt halt when a Japanese attack on Myitkyina airfield rendered it unusable.

The able-bodied men left behind began a treacherous trek out of Burma to the sanctuary of India or China. As they moved out of the fortifications and into the jungles, they carried what they could for sustenance and protection. Air supply efforts played a

⁶⁵Ibid.

⁶⁶Army Air Force Statistical Digest Table 94, 171.

⁶⁷Taylor, *Air Supply in the Burma Campaign*, 10.

⁶⁸Tuchman, *Stilwell and the American Experience in China*, 292-3.

⁶⁹Taylor, *Air Supply in the Burma Campaign*, 10.

⁷⁰Ibid.

role in keeping these men alive. Douglas C-47s airdropped approximately 54 tons of food to the refugees and retreating soldiers along trails leading out of Burma. Unfortunately, missed airdrops and enemy air activity wasted a great deal of the supplies.⁷¹ Many of these evacuees made it as far north as the British outpost called Fort Hertz, and they operated out of that location until they could move into India or China.

The steady increase in survivors reaching Fort Hertz quickly depleted the fort's resources. Like many locations in the country, the Burma Road had supplied Fort Hertz. After it was closed, Allied air supply needed to sustain the fort for as long as possible because retreating forces out of Burma (American, British, and Chinese army units) remained at Fort Hertz and the Chin Hills leading into India. One of the largest documented forces to move through the area was the Chinese 5th Army. After a brief stay in the Fort Hertz area, a force of 7,000 expected to return to China via the mountain passes to the north of Myitkyina; however, the monsoons slowed their retreat and forced them to live off the land.⁷² Starving and running short of supplies, the Chinese 5th Army was supported by several airdrop missions conducted by the USAAF and the CNAC. In May 1942, the USAAF and CNAC delivered a total of four tons of rice and, in June, 80 tons.⁷³ As more air transports became available, the tonnage levels increased. In July, for example, a one-day total exceeded 17 tons.⁷⁴ After the monsoon season ended in October, the Chinese 5th Army made its way to Assam and linked up with the remainder of

⁷¹Taylor, *Air Supply in the Burma Campaign*, 10.

⁷²Romanus and Sunderland, *Stilwell's Mission to China*, 118-47.

⁷³Taylor, *Air Supply in the Burma Campaign*, 11.

⁷⁴*Ibid.*

Stilwell's forces. The air supply efforts had kept an important fighting force alive and bolstered Stilwell's available combat power by some 7,000 Chinese soldiers.⁷⁵

The evacuation of combat forces from Burma was nearly complete by November 1942, but the remaining refugees also required assistance. Again, the only means to supply them came from USAAF, RAF, and CNAC air transports. The aircrews conducted unscheduled airdrops to support the refugees along the trails for as long as possible.⁷⁶ By the end of 1942, air supply had saved countless lives and provided necessary fighting material to the forces in the field. The Tenth Air Force's Ferry Command started the war with absolutely no air transports and ended November 1942 with 43 airplanes.⁷⁷ As additional combat power arrived, the Allies began preparations to go on the offensive against the Japanese in Burma. With the evacuation of Burma complete, the British committed land forces to a major offensive against the Japanese in Burma.

The Burma Campaigns

The air supply operations in Burma became necessary the instant the allies decided on offensive combat operations there. This was not extraordinary because every theater in World War II received support from TCC. The C2 issues in the CBI, however, complicated the TCC's mission and forced it to compete with ATC over the areas of responsibility. The Tenth Air Force originally supplied both the IBS and the CATF. It did not accomplish either mission particularly well because request for air supply went

⁷⁵Ibid.

⁷⁶Ibid.

⁷⁷Army Air Force Statistical Digest Table 94, 171.

unfilled due to a lack of aircraft and aircrews. Theater commanders requesting more than the command could deliver also complicated operations.⁷⁸ Stilwell's insistence on creating a land LOC added additional pressure and prompted the planners to reestablish the Troop Carrier Group in the CBI.

The original Ferry Command had all but disappeared as it transformed from the Assam-Burma-China Ferry Command and Trans-India Ferry Command into the India-China Ferry Command and, finally, into the ICW of ATC. To provide intra-theater airlift, two troop carrier squadrons represented the TCC. Tasked with supporting tactical air supply operations in both India and China, the 1st and 2d Troop Carrier Squadrons (TCS) split the responsibility. The 1st TCS supported India whereas the 2d TCS supported China. With ATC now tasked to support China, the 2d TCS returned to India to assist the 1st TCS with its mission in India and to conduct air supply missions to Burma.

Two squadrons were not sufficient to create a troop carrier group. Nonetheless, Brigadier General William H. Old, who previously had served as the Ferry Command commander assumed responsibility for the two squadrons. The Air Staff sent two more squadrons to the CBI in 1943. With the additional squadrons, Old formed a Troop Carrier Command for the CBI.⁷⁹ The command conducted intra-theater airlift throughout India and northern Burma and became an integral part of Wingate's second expedition.

The command's tasking remained high, however, and when a crisis developed in Imphal in 1944, the command required outside assistance to help the beleaguered troops

⁷⁸Taylor, *Air Supply in the Burma Campaigns*, 14.

⁷⁹Andrew Dax, "The Challenges of Air Supply and Support of Allied Forces Behind Enemy Lines in the China-Burma-India Theater of Operations, 1943-1944" (PhD diss., St. John's University, 2008), 32.

in Imphal, India, while still providing support to the Ledo Road construction. Elements of the Twelfth Air Force arrived to provide additional airlift capability to Old's TCC because his command was insufficiently equipped to handle the air supply requirements for the Imphal operation, the construction of the Ledo Road, and Operation Thursday—the Second Chindit operation. Stilwell's road remained a top priority, and the planners would not allow the construction effort to falter. This misdirected energy forced the ATC for the first time to supply operations in Burma, taking away necessary tonnage for China and the Fourteenth Air Force.⁸⁰

Interestingly, Old's TCC supported operations throughout the theater and played key roles in the Second Arakan Campaign and the siege of Imphal. Additionally, the TCC supported Wingate's second expedition without hesitation and provided his force with necessary materiel during the entire excursion. However, the operations along the Arakan and Brigadier Orde Wingate's missions were distinctly British operations, designed to enhance British interest in the theater.

The British set out on three such operations along the Arakan region, spread out over a period of two years. The First Arakan Campaign took place between December 1942 and May 1943, the Second Arakan Campaign occurred between November 1943 and February 1944, and the Third Arakan Campaign lasted from November 1944 to February 1945. Wingate's expeditions operated in conjunction with the first and second Arakan campaigns and attempted to disrupt Japanese rear operating positions and

⁸⁰John G. Martin, ed., *China Airlift*, The Hump 3 (Poplar Bluff, MO: Turner, 1991), 46.

strategic LOCs. Each campaign built on the previous ones, using air supply to varying degrees.

The First Arakan Campaign December 1942–May 1943

Only seven months passed before the Allies conducted an offensive to drive the Japanese out off Burma. Although ambitious, Stilwell planned for a major operation that consisted of an invasion of northern Burma by American and Chinese forces, coupled with a British assault on southern Burma (figure 12). The plan stalled from the beginning as both the British and Chinese never fully supported the plan.⁸¹

Instead, they favored a limited operation that consisted of using a smaller amphibious assault on the Arakan region of Burma with limited objectives of securing airfields in the Akyab area. Unfortunately, this plan collapsed due to the higher priority shipping needs for the North Africa campaign. The final allied effort consisted of an advance by the 14th Indian Division supported by the 26th Indian Division down the Mayu Peninsula in an attempt to take Akyab by land (figure 13).⁸²

⁸¹Taylor, *Air Supply in the Burma Campaigns*, 12.

⁸²*Ibid.*, 28.

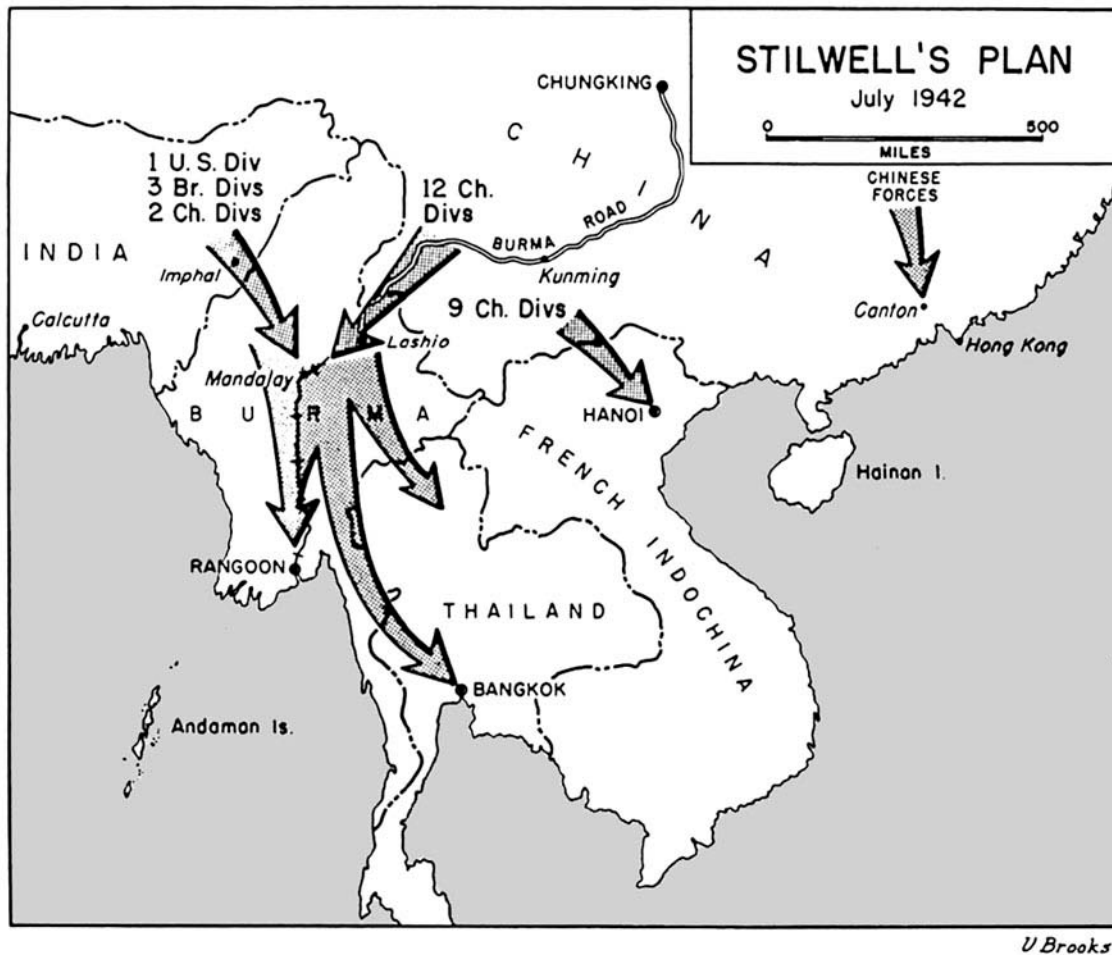


Figure 12. Lieutenant General Joseph Stilwell's Plan to Retake Burma and Thailand
Source: Charles Romanus and Riley Sunderland, *Stilwell's Mission to China*, United States Army in World War II: China-Burma-India Theater 1 (Washington, DC: Department of the Army, 1953), 122.

It is not clear why the operation did not begin on time. Perhaps the delay occurred from a lack of combat support, which did cause a delay later in the operation. Other delays during preparation allowed the Japanese to reinforce their two battalions with its 55th Division. During the initial phases of the battle, a patrol reached the end of the Mayu Peninsula directly opposite Akyab Island as the main body of troops sat ten miles to the

north. The advance halted, however, due to a lack of adequate combat support.⁸³ The British and Indian forces suffered a two-week delay in order to reorganize the supply situation. By this time, the Japanese had reinforced their lines, and they prepared for a counteroffensive. The fighting in the Arakan lasted for five months on the Mayu Peninsula. The Japanese outflanked the road-bound Indian formations, isolating them in small units. These tactics were the same tactics the Japanese used during the initial conquest of Burma and still proved effective, forcing the British and Indian forces to retreat and protect their LOCs. By May 1943, the 14th and 26th Indian Divisions were back at their starting points, weakened by having 2,500 killed, wounded, or missing.⁸⁴

⁸³Ibid., 12.

⁸⁴Ibid.

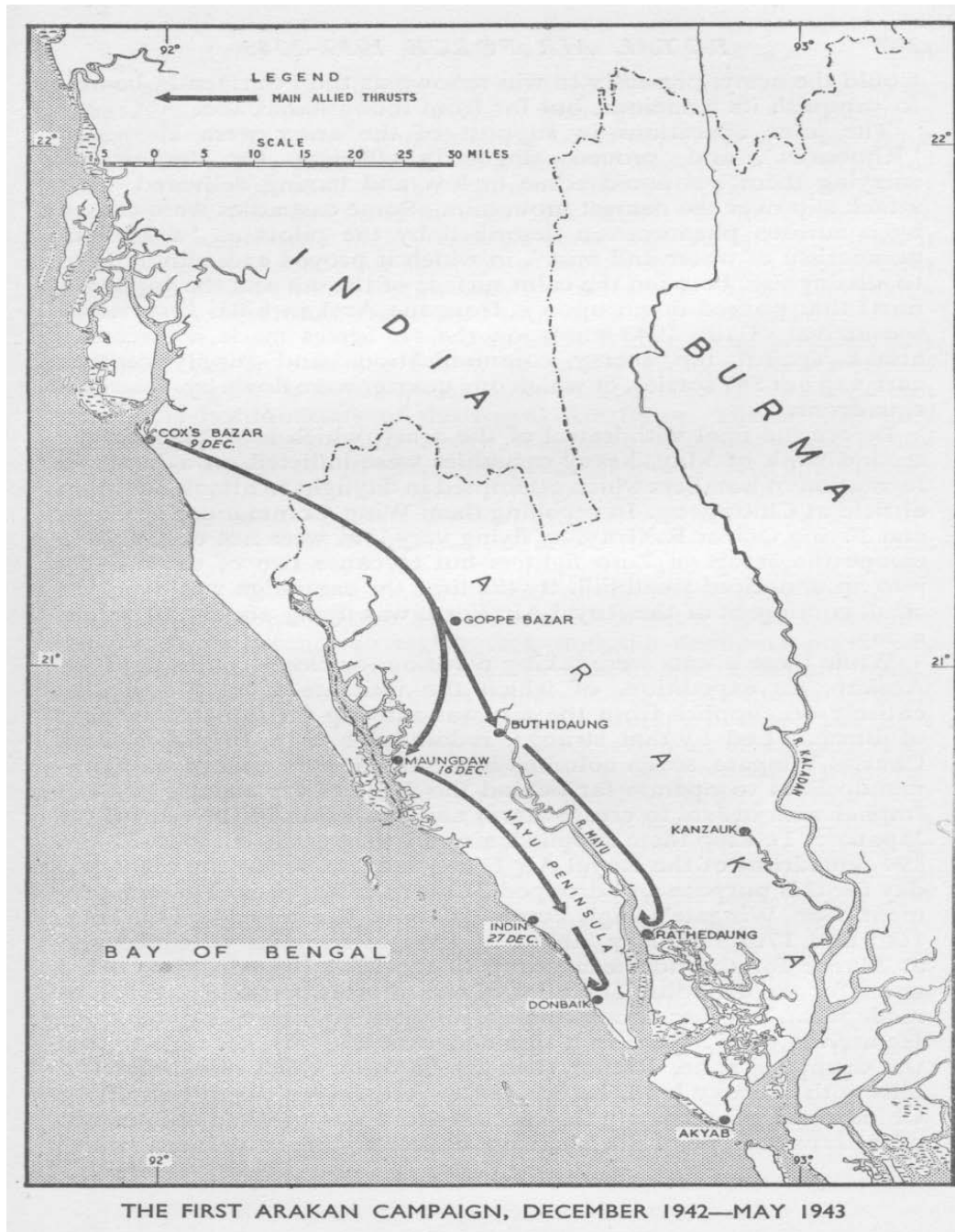


Figure 13. The First Arakan Campaign, December 1942-May 1943
 Source: Hillary St. George Saunders, *The Fight Is Won*, Royal Air Force, 1939-1945
 (London: Her Majesty's Stationery Office, 1954), 302.

The Japanese exploited the British supply weakness. Though superior in number, the two Indian Divisions were constantly threatened by the Japanese.⁸⁵ The Japanese used tactics that cut their enemy forces into smaller pockets of fighting units and then overwhelmed them with superior firepower. The smaller fighting units were then cut off from their supply and ultimately decimated by the Japanese. Air supply was absent during the first Arakan campaign. The delays witnessed by the Allies during the start of the offensive possibly stemmed from not having enough material on hand or a means to distribute those supplies properly along the line of advance. The RAF had only one transport squadron, which was committed to support Brigadier Orde Wingate's long-range expedition. Additionally, neither Lieutenant General William Slim of the British 14th Army nor Lieutenant General Noel Irwin, the campaign commander, ever considered air supply as an option.⁸⁶

Air supply operations for the First Arakan Campaign were tied to Wingate's expedition, which called for the infiltration of forces deep behind enemy lines while the main effort concentrated on attacking Japanese positions in northern Burma (figure 14). Charged with disrupting enemy communications behind enemy lines (between Mandalay and Myitkyina and between Mandalay and Lashio), Wingate led his 77th Brigade, known as the Chindits, on a daring mission using only air supply for sustainment.⁸⁷

⁸⁵Ibid.

⁸⁶William Slim, *Defeat into Victory: Battling Japan in Burma and India, 1942-1945* (New York: Cooper Square Press, 2000), 149-65.

⁸⁷Taylor, *Air Supply in the Burma Campaigns*, 14.

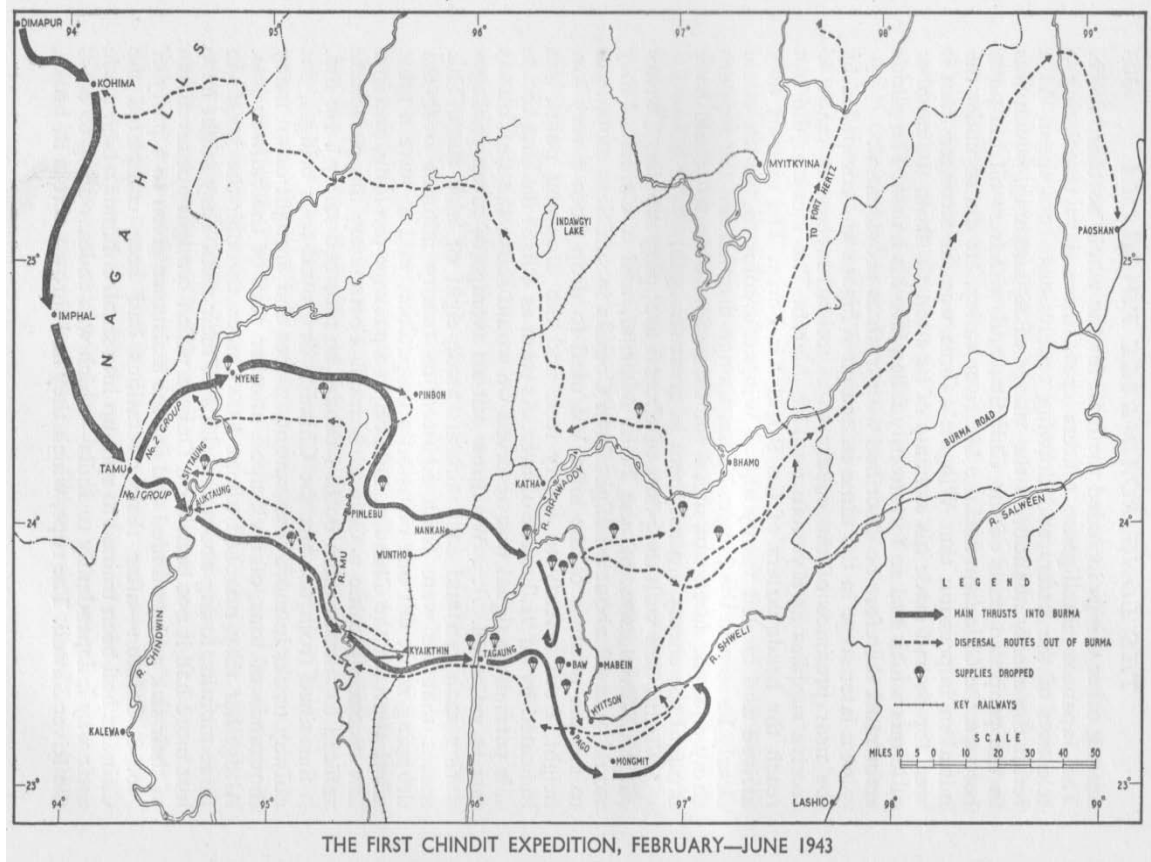


Figure 14. The Column Movements and Airdrop Points of the First Wingate Expedition 18 February 1943 to 2 June 1943

Source: Hillary St. George Saunders, *The Fight Is Won*, Royal Air Force, 1939-1945 (London: Her Majesty's Stationery Office, 1954), 305.

Wingate expanded the role of air supply. He stripped his forces of all surplus equipment and proceeded with only animal transport and battery-powered radios that could contact the supply station in Assam, India. This tactic reduced the Chindits' supply needs. Wingate then split his brigade into seven columns and proceeded on his mission. Each column possessed a team of RAF air officers and enlisted men who would coordinate a list of necessary supplies with the supply base in Assam. The aircraft would

then be loaded and dispatched to an area identified by the RAF liaison officer.⁸⁸ This typically meant an airdrop to a designated drop zone (DZ). By having an air-minded officer on the staff, the RAF officer could better review the charts for the best possible DZ and coordinate the effort with the Assam headquarters.⁸⁹ When the situation presented itself, the RAF liaison officers would also coordinate medical evacuations. Splitting the brigade made it easier to resupply because a three-ship formation of aircraft could carry enough supplies for a column of 750 men.⁹⁰

Wingate's expedition (Operation Longcloth) was novel in concept but accomplished little. The brigade suffered thirty percent casualties, with most of the wounded and exhausted left behind.⁹¹ The casualties and damages inflicted on the Japanese were light. Moreover, the reliance on air supply had its faults and left room for improvement. For example, the communication process in which the RAF liaison officers coordinated their airdrops was complicated by the inability to coordinate the drops directly with the aircraft. Instead, they planned the drops to areas ahead of the advancing columns in anticipation of reaching the supplies before the enemy. These missions were coordinated via unbreakable coded radio messages to Assam.⁹²

Making matters worse, the Japanese maintained air superiority over the region, forcing the aircrews to conduct most of the drops at night. An advanced party from the

⁸⁸Charles James Rolo, *Wingate's Raiders* (New York: Viking Press, 1944), 57-66.

⁸⁹Taylor, *Air Supply in the Burma Campaigns*, 14.

⁹⁰Rolo, *Wingate's Raiders*, 58.

⁹¹Taylor, *Air Supply in the Burma Campaigns*, 14.

⁹²Rolo, *Wingate's Raiders*, 57-66.

column would identify the DZ by lighting torches at night or using smoke signals during the day. If they encountered Japanese forces, they abandoned the recovery and proceeded to another location.⁹³ It is quite possible that, if the RAF liaison officers were in direct contact with the aircrews, they could have redirected the airdrop missions to new DZs as required to prevent the loss of the precious supplies. Finally, the radios used by the RAF liaison officers eventually failed due to dead batteries. Over time, the expedition became scattered, and Wingate's forces retreated to India.⁹⁴ However, the operation improved morale among Wingate's ground forces and opened the door to tactical air supply operations by demonstrating the feasibility of air supply to ground forces in combat.⁹⁵

The experiences of the RAF 31 Transport Squadron during Operation Longcloth interested the USAAF Air Staff planners. The 31st and 194th Transport Squadrons had successfully airdropped 303 tons of supplies to Wingate's forces.⁹⁶ The concept was not new, but it was enhanced by Wingate's vision to rely solely on air supply for combat support. With Wingate's forces back in India and the monsoon season quickly approaching, the Allies had to make decisions regarding future operations in Burma. The dry season ended with little fanfare for the Allies. Although categorically considered failures, the First Arakan Campaign and the First Wingate Expedition offered evidence for the use of air supply in offensive combat operations in Burma.

⁹³Ibid.

⁹⁴Taylor, *Air Supply in the Burma Campaigns*, 14.

⁹⁵Ibid.

⁹⁶Hillary St. George Saunders, *The Fight Is Won*, Royal Air Force, 1939-1945 (London: Her Majesty's Stationery Office, 1954), 303.

The Combined Chief of Staff (CCS) debated over the use of air supply in support of combat operations. Between 1942 and 1943, the CBI air forces began to increase in size. Aircraft deliveries to the theater were still slow, but there was little doubt that, once the Tenth Air Force and the RAF received its assets, they could conduct sustained air operations. British Lieutenant General Wavell had once argued that he needed 64 bomber and pursuit squadrons in order to defend India and Ceylon successfully. In early 1942, he had only 10 squadrons.⁹⁷ The RAF 31 Transport Squadron contributed largely to British operations and received support from the USAAF. Other deficiencies consisted of the lack of suitable airfields and poor radio-communication networks. If the Allies were going to retake Burma and re-establish the land supply lines to China, they needed to address these deficiencies.

During the Cairo Conference, 22-26 November 1943, the CCS formulated plans to retake Burma and reestablish the landline to China. The plan emphasized the following:

1. An amphibious attack on the Andaman Islands.
2. A second advance down the Mayu Peninsula to the Arakan region.
3. An advance from Imphal via Tiddim and the Kabaw Valley across the Chindwin River.
4. An advance from Ledo down the Hukawng Valley and along the trace of the Ledo Road to Mogaung and Myitkyina.

⁹⁷London Gazette Archives, *Operations in Eastern Theatre, Based on India, From March 1942 to December 31, 1942*, 4664.

5. An advance across the Salween from Yunnan to secure the eastern part of the Burma Road.
6. A second long-range penetration to attack Japanese lines of communication
7. An airborne operation against the Japanese airfield at Indaw.⁹⁸

Because the plans were overly ambitious, the Allies cancelled or postponed many of them until sufficient assets were available.⁹⁹ The Allies cancelled the Andaman Islands offensive in favor of their action in the Mediterranean. Chiang Kai-shek cancelled the Salween offensive because of the cancellation of the Andaman Islands offensive. He saw that cancellation as a breach of contract because the Americans and British rerouted assets to support other war efforts that did not support the Chinese plight.¹⁰⁰ This animosity subsequently caused a domino effect for the other offensives. Admiral Lord Louis Mountbatten, the Supreme Allied Commander, then cancelled the airborne operation against Indaw. He believed that the abandonment of the Salween offensive negated the value the airborne operation.¹⁰¹ Stilwell now considered the Ledo Road as the Americans' primary mission in the IBS, and he was prepared to send his Chinese-American forces into Burma as soon as the 1943 rains ended.¹⁰²

⁹⁸Taylor, *Air Supply in the Burma Campaign*, 17.

⁹⁹*Ibid.*

¹⁰⁰*Ibid.*

¹⁰¹*Ibid.*

¹⁰²*Ibid.*

Northern Burma Campaigns

Plans for the Ledo Road, however, existed well before Stilwell arrived in theater. Crafted by the Chinese, the plans called for the use of lend-lease material to connect India via Burma to China through some of the most difficult terrain imaginable. From Ledo, the road would traverse the northern reaches of Burma and extend south through Myitkyina, down to Bhamo, Burma and onto the Burma Road, where supplies could reach the railhead at Mogaung (figure 15).

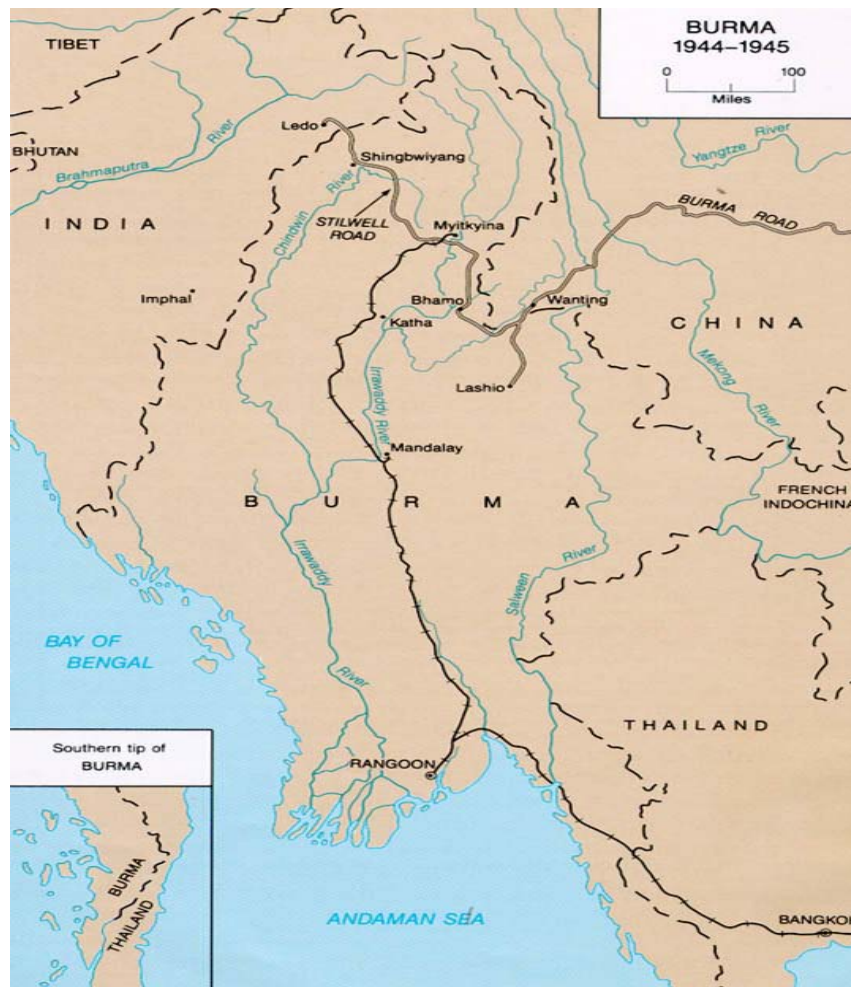


Figure 15. The Ledo and Burma Road 1944–1945

Source: David W. Hogan, Jr., *India-Burma 1942: The U.S. Army Campaigns of World War II*, CMH Publication 72-5 (Washington, DC: Center of Military History, 1995), 4.

Stilwell's staff estimated the road could be used for moving 65,000 tons per month, easily exceeding the air supply tonnage efforts of the Tenth Air Force's Ferry Command air supply mission over the Hump to China.¹⁰³ At that point, the Hump air supply mission was still in its infancy and considerably inadequate to meet the stated requirements. The Ferry Command (which would eventually hand the responsibility over to ATC) was able to provide only 100 tons of supplies per month to the Chinese and the Fourteenth Air Force because of a lack of airfields in India and the constant draw of aircraft away from the Hump airlift effort.¹⁰⁴

Stilwell insisted on reopening the landlines to China, but doing so required the suppression of Japanese forces in northern Burma. Chennault disagreed and believed the projected tonnage levels were overly optimistic. He doubted that such an extended network of trails through difficult jungle could ever match the amount of supplies delivered by air transport.¹⁰⁵ Even when the Burma Road was open, the best that could be provided was 200 tons per day (6,000 tons per month).¹⁰⁶ Churchill seemed to agree. The British Prime Minister called it "an immense, laborious task, unlikely to be finished until the need for it has passed."¹⁰⁷ In fact, the British saw the whole project as a drain on

¹⁰³Mark D. Sherry, *China Defensive* (Washington, DC: Center of Military History, 1996), 14.

¹⁰⁴Tuchman, *Stilwell and the American Experience in China*, 308.

¹⁰⁵Guangqiu Xu, *War Wings: The United States and Chinese Military Aviation, 1929-1949* (Westport, CT: Greenwood Press, 2001), 189.

¹⁰⁶Rolo, *Wingate's Raiders*, 3.

¹⁰⁷Brendan I. Koerner, *Now the Hell Will Start: One Soldier's Flight from the Greatest Manhunt of World War II* (New York: Penguin Press, 2008), 311.

resources and attempted to undermine the project from behind the scenes.¹⁰⁸ During the 1943 Trident Conference, the British insisted on increasing the Hump air supply mission to China and Fourteenth Air Force. The British government believed the Hump air supply mission would provide more material than the Ledo Road.¹⁰⁹

Stilwell had not completely discounted air supply's contribution to the overall effort. During the planning phase for Ledo Road's construction, air supply would support his troops as they moved forward with road construction and with offensive operations. This was going to be a major effort, and they would need new airfields to support operations. The airfields would allow for aircraft to land instead of conduct air supply via airdrop. Ironically, Stilwell sought to use air supply to support the building of a road designed to do what air was already doing. The plan called for moving engineering forces into occupied territory and even retaking the Myitkyina airfield currently under Japanese control.

The Drive to Myitkyina and the Construction of the Ledo Road

All arguments for the Ledo Road aside, combat operations reopened against the Japanese in mid-October 1943. In order to construct the Ledo Road, Stilwell planned for the Chinese 22d and 38th Divisions to begin moving east out of Ledo, India, over the Patkai Hills and into the Hukawng Valley (figure 16). Using some portions of the partially completed Ledo Road, his force would use sections of a Japanese land route

¹⁰⁸Tuchman, *Stilwell and the American Experience in China*, 342.

¹⁰⁹Xu, *War Wings*, 190.

created for dry-season movement.¹¹⁰ The goal was to move into the northern Burma region and capture Myitkyina and its airfield.

The advance of Chinese and American forces into northern Burma allowed engineers and workers to construct the Ledo Road. By 27 December 1943, the engineers opened Ledo Road to as far as Shingbwiyang. Engineers then turned their attention to improve the Kamaing Road to provide a temporary route from Shingbwiyang southward.¹¹¹

As the road construction continued, the engineers improved the Kamaing Road by creating a new road on higher ground and adding provisions for a fuel pipeline. The engineers and Chinese laborers consumed many resources from the combat supply points along the routes, and air supply played a major role in supporting these men. Stilwell had his road completed to at least Shingbwiyang and distributed some supplies to the combat units just south of Shingbwiyang, but air supply was still more efficient and economical. The C-47¹¹² could carry more cargo on one sortie than one truck could and could make ten or more round trips while a truck made only one.¹¹³ The deeper the Chinese-American forces infiltrated into Burma, the more the supply distribution system favored air supply.¹¹⁴

¹¹⁰Taylor, *Air Supply in the Burma Campaigns*, 19.

¹¹¹*Ibid.*

¹¹²The C-47 max payload was 6,000 lbs.

¹¹³Taylor, *Air Supply in the Burma Campaigns*, 20.

¹¹⁴*Ibid.*

The demand for supplies increased exponentially. In October 1943, the tonnage requirement was 638 tons. As December approached, the commitments exceeded 1,669 tons, and by January 1944 the tonnage exceeded 3,107 tons. Just before the start of the monsoons, the tonnage levels reached 7,309 tons.¹¹⁵ Between 1 October 1943 and 31 May 1944, air supply delivered 23,451 tons of cargo.¹¹⁶

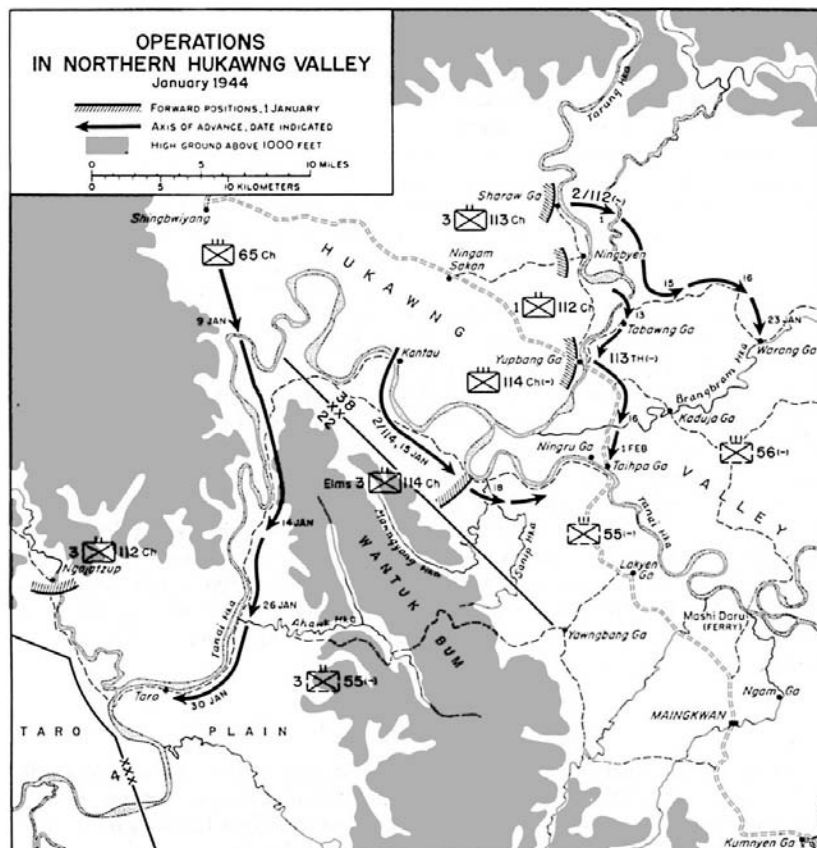


Figure 16. The Advance of the 22d and 38th Divisions
into the Hukawng Valley in January 1944

Source: Charles Romanus and Riley Sunderland, *Stilwell's Command Problems*, United States Army in World War II: China-Burma-India Theater 2 (Washington, DC: Department of the Army, 1956), 144.

¹¹⁵Ibid., 19.

¹¹⁶Ibid., 20.

For the Northern Combat Area Command (NCAC), the construction of the Ledo Road was paramount, but maintaining such a construction operation required additional airlift assets beyond and above the assigned flying squadrons. Thus, the 1st and 2d TCS received additional aircraft and manpower, and the TCC received two additional squadrons, the 27th and the 315th Troop Carrier Squadrons. In addition, the 64th Troop Carrier Group arrived in April 1944 from Sicily and supported operations in northern Burma. From 1 October 1943 to 31 May 1944, the TCSs flew over 3,500 missions supporting Stilwell's Ledo Road construction effort and the NCAC.¹¹⁷ In contrast, when the 64th Troop Carrier Group returned to Sicily, it flew over 2,200 sorties during a three-month period, and some of those sorties counted as part of the CBI effort.¹¹⁸ Bringing in the additional aircraft and aircrews to provide air supply to the troops in the forward areas meant establishing additional airfields and DZs along the construction route. One of the best locations to hub the air supply mission and still be close to the line of advance was the airfield in Myitkyina.¹¹⁹

The overall objective for the Northern Campaign was the capture of Myitkyina, (figure 17). When Stilwell's forces held the initiative, they could not afford delays. Their timetable required them to move quickly down to Kamaing and Mogaung before the start of the monsoon season (June through October).

¹¹⁷Ibid.

¹¹⁸Headquarters Twelve Air Force, *Troop Carrier Operations, 1944* (APO 650, US Army, 1944), 17.

¹¹⁹Ibid., 25.

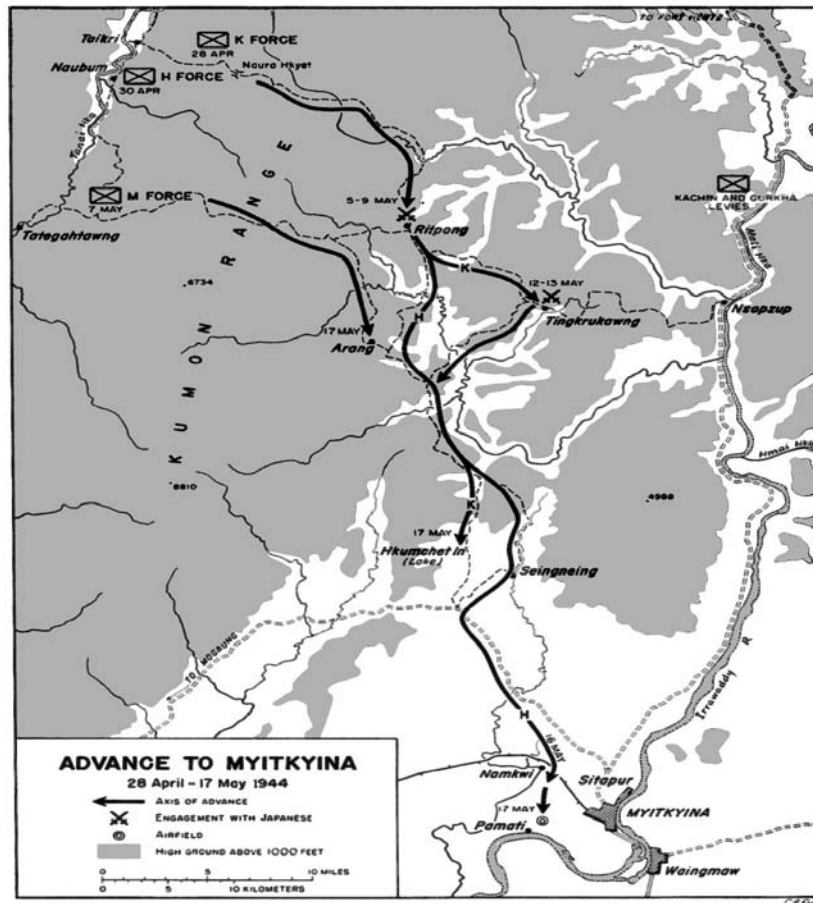


Figure 17. The Advance to Myitkyina, 28 April to 17 May 1944

Source: Charles Romanus and Riley Sunderland, *Stilwell's Command Problems*, United States Army in World War II: China-Burma-India Theater 2 (Washington, DC: Department of the Army, 1956), 224.

Until that point, Stilwell's forces had been quite successful. Aided by air supply, Stilwell's troops cleared much of the Hukawng Valley of Japanese forces, leaving only the embattled Imperial Japanese Army's 18th Division in their tracks.¹²⁰ Because of the slow progress, Stilwell ordered Merrill's Marauders to take the airfield. Their movement across the region required navigating the dangerous Kachin paths in the mountains and

¹²⁰Headquarters Twelve Air Force, *Troop Carrier Operations, 1944* (APO 650, US Army, 1944), 25.

crossing the Irrawaddy River Valley. Merrill's Marauders split into three teams and captured the airfield on 17 May 1944.¹²¹ As a result, reinforcements began to flow into the airfield located three miles from the city of Myitkyina (figure 18).

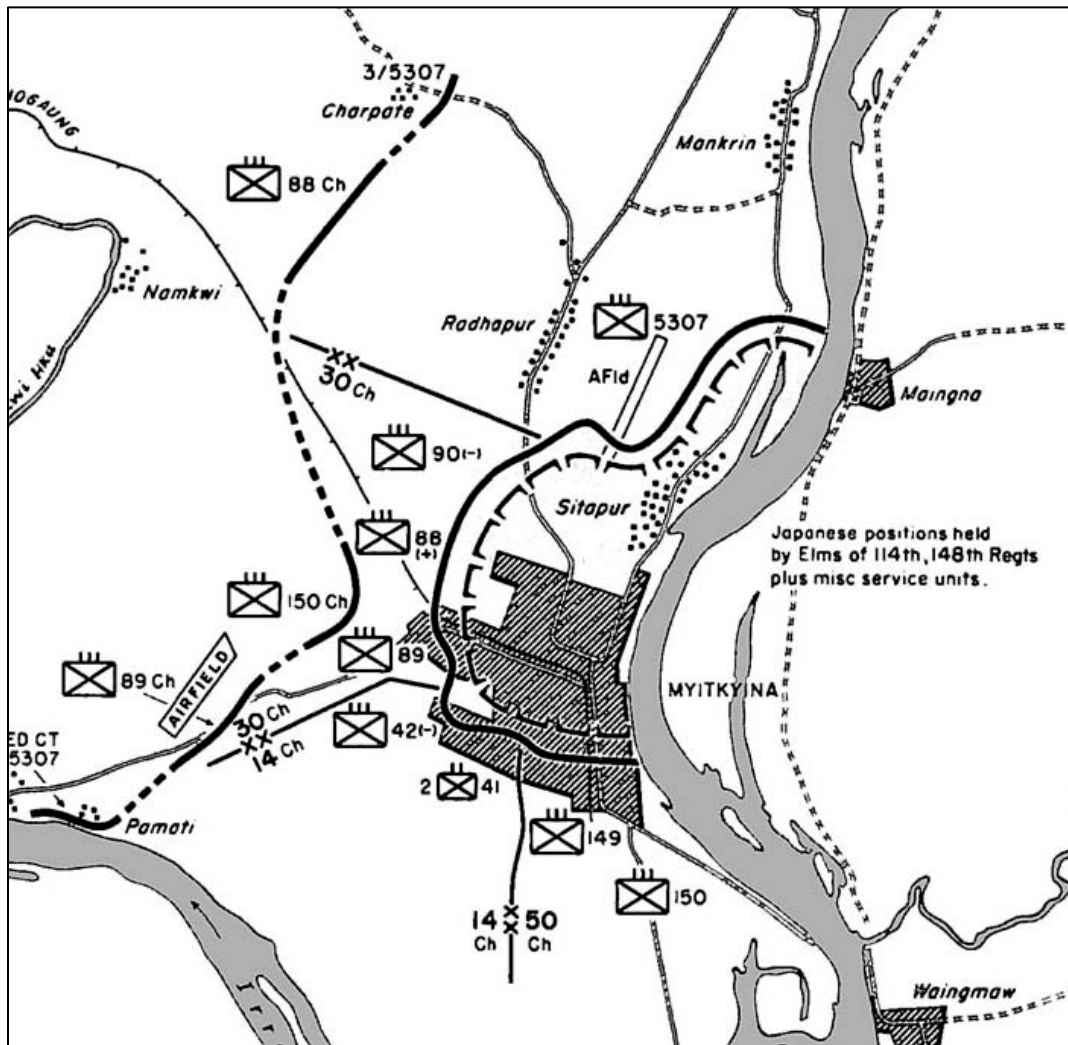


Figure 18. Myitkyina, Its Airfield, and the Disposition of Forces

Source: Charles Romanus and Riley Sunderland, *Stilwell's Command Problems*, United States Army in World War II: China-Burma-India Theater 2 (Washington, DC: Department of the Army, 1956), 231.

¹²¹Mary Williams, *United States Army in World War II, Special Studies, Chronology 1941-1945* (Washington, DC: Department of the Army, 1989), 194.

The aircrews cancelled scheduled airdrops in favor of landings; however, the Japanese still held the town, and after realizing the Chinese-American objective, they moved additional forces into Myitkyina. Air supply efforts continued with the use of C-47s and C-47s towing CG-4 gliders (figure 19), bringing in additional troops from Sookerating. The Japanese successfully reinforced their garrison in the city from 700 men to over 3,500 and prepared for the city's upcoming defense. The Allied combat power was still not available to dislodge the Japanese from the city. As more Chinese-American forces arrived, a siege of Myitkyina was underway.

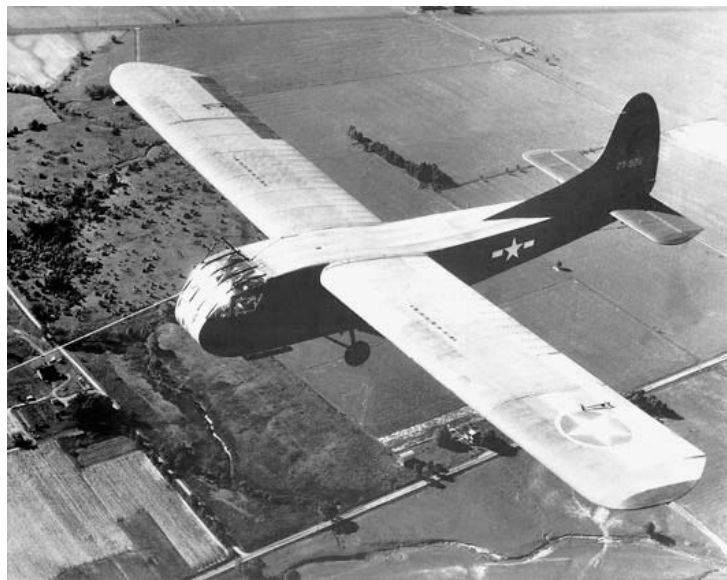


Figure 19. CG-4 Glider

Source: Waco CG-4 1941, http://www.aviastar.org/air/usa/waco_cg-4.php (accessed 10 November 2010).

Air transport operations into Myitkyina presented flight safety issues for the aircrews. The intelligence officers informed the first crews arriving in Myitkyina that the

airfield was heavily mined. With this knowledge, many of the gliders approached the airfield at awkward angles and littered the airfield in every direction.¹²²

There was no discernable traffic pattern, and C-47s and their tows approached the airfield without direction or support from a controlling agency. An L-5 (figure 20) observation aircraft arrived shortly after the first C-47s and was supposed to place landing signal material on the field to assist the glider pilots with knowing where to land. Before the team in the L-5 could accomplish their mission, the gliders were already overhead.¹²³



Figure 20. L-5 Observation Airplane

Source: Wesley Craven and James Cate, *Men and Planes, The Army Air Forces in World War II* 6 (Chicago: University of Chicago Press, 1955), 220.

Myitkyina airfield continued to be used until the end of the war, and the airfield served as a critical supply hub. Not only was its capture key to the success of the construction of the Ledo Road, but it also offered ATC an additional airfield to conduct

¹²²Taylor, *Air Supply in the Burma Campaigns*, 26.

¹²³*Ibid.*

airlift missions to China, removing the Japanese Army Air Force threat and opening a safer southern route over the Himalayas. By opening such a route, the newer C-54s, which struggled on the northern routes, could exploit their payload advantage over both the C-46s and C-47s and safely deliver the necessary tonnage requested by the Chinese and the Fourteenth Air Force.

The engineers repaired the runway and then used the airfield as a marshaling point for all future construction efforts. The troop carrier squadrons brought in much of the heavy equipment for the engineers and much of the equipment for the pipeline.¹²⁴

By 3 August 1944, the Japanese 33d Army command could no longer support its forces in Myitkyina and ordered them to evacuate. After 76 days of laying siege to the city of Myitkyina, the Chinese entered the city.

The Japanese in Burma were feeling the pressure from practically all sides. The NCAC made major inroads into northern Burma, and the long-range patrols wreaked havoc on Japanese strategic LOCs in the rear positions. Furthermore, as more allied pursuit squadrons arrived with better equipment (USAAF P-51s and RAF Spitfires), Japanese air superiority diminished. As agreed upon in the Trident Conference, the British went forward with their plans for the Second Arakan Campaign.

Second Arakan Campaign

The British and Indian forces attempted a second offensive against the Mayu Peninsula in the Arakan region in an effort to capture Akyab Island and gain a foothold in southern Burma. Like the first campaign, the second called for the use of amphibious

¹²⁴Ibid., 26.

landings near Akyab Island, and like the first, the vessels necessary for an amphibious assault were unavailable. The Second Arakan Campaign included two Indian Divisions, the 5th and 7th, who would press their attack against the Japanese over the east and west sides of the Mayu range with control of the Maungdaw-Buthidaung Road. Additional support came from the 81st West African Division, which would advance down Kaladan Valley and protect the flanks of the main force—the 5th and 7th Indian Divisions.¹²⁵ The 5th Indian Division would be supplied by road and river whereas the 7th Indian Division would be supplied by road alone. Air would supply the 81st West African Division. This campaign was very different from the first in that the RAF fighters targeted much of the Japanese strategic LOCs—rail yards and airfields. The difference between the First and the Second Arakan campaigns centered on the planners seeking suitable landing strips for air supply operations. The Second Arakan Campaign was planned to use air supply to mitigate the reliance on ground lines of communications LOCs.

The British advance down the Arakan met with little resistance until they reached the Maungdaw-Buthiduang Road, where Japanese resistance was strong and halted the British advance. Fearing a possibility of being outflanked, the British deployed forces from the 5th Indian Division to support the 7th Indian Division. However, Japanese forces had already moved beyond the flanks and had actually surrounded them. As a command and control measure, the XV Corps established the Administrative Box and called for air supply to support the beleaguered portions of the 5th Indian Division and all of the 7th Indian Divisions at that location (figure 21).

¹²⁵Ibid., 20.

With air supply, the Allies repulsed every Japanese attack. The British army had learned valuable lessons from the First Arakan Campaign and applied them during the second battle. Organization was the key. Even though the USAAF organizational structure seemed fractured, Lieutenant General William Slim of the British 14th Army praised the efforts of the Joint American and British Troop Carrier Command. Made up of the RAF Tactical Air Force (TAF) and the USAAF TCC, they worked together in a joint command supporting both British and American forces with air supply. During the initial advance down the Arakan, the RAF and USAAF C-47s supplied the 81st West African Division with ammunition and food.¹²⁶ When Slim was notified of the 7th Indian Division's situation, he did not hesitate to request that the 7th Indian Division, now cut off from the land supply routes, be sustained by air supply.¹²⁷ The aircrews of the joint American and British TCC flew around the clock to support the embattled troops in the Administrative Box. Aircrews flew three to four sorties per day to ensure that enough supplies arrived to the forces in the encampment.¹²⁸

The Japanese objective was to crush the 7th Indian Division and then turn on the 5th Indian Division and press on to New Delhi. They expected to take the supplies from the decimated British forces and capture any unrecovered air-dropped supplies. However, the Japanese faced a major problem: The British were using new tactics and were no longer dependent on ground based supply routes. This tactic had worked quite well during the First Arakan Campaign for the Japanese, but this engagement was entirely

¹²⁶Slim, *Defeat Into Victory*, 212.

¹²⁷*Ibid.*, 236.

¹²⁸*Ibid.*, 236-42.

different. Blessed with good fortune, Slim's command received captured Japanese documents that detailed the Japanese operation and timetable. Though fighting was fierce, Slim's forces held and then started to encircle the weary Japanese, who were running low on ammunition, food, and medical supplies. With their timetable in ruins, the Japanese attacks began to falter, and units became disorganized. By the end of February 1944, they retreated back into the jungles down the Mayu Range.

The Japanese forces proved too weak to sever the LOCs for the 5th Indian Division and were unprepared to handle the reserve fighting force of the 26th Indian Division, which proceeded down the valley to support the units in the Box. In the end, the Allied effort annihilated the Japanese 55th Division. The Second Arakan Campaign was arguably an Allied victory. The casualties suffered by the Indian and West African forces nearly equaled those of the Japanese, but they had effectively destroyed a menacing fighting force, the Japanese 55th Division, which decimated the 14th and the 26th Indian Divisions in the previous year.

Keeping the pressure on the Japanese, Slim requested additional air supply support. However, with Wingate's second expedition about to begin, there were few air transports available. The only aircraft that could be used to support Slim's operation belonged to ATC. Pleading with the CCS, Mountbatten successfully secured 25 C-46s to support Slim's forces.¹²⁹

¹²⁹Ibid., 242.

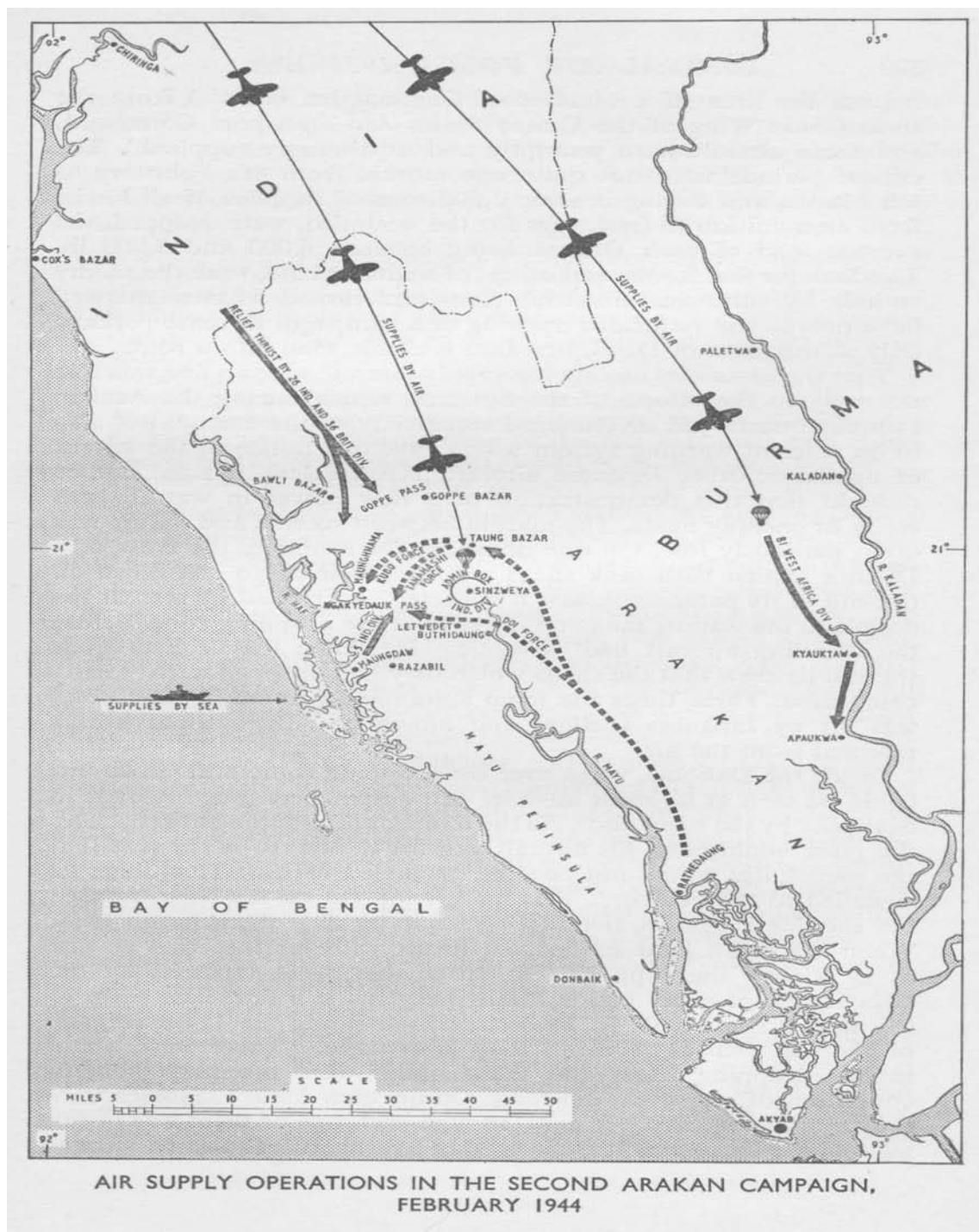


Figure 21. Air Supply Operations in the Second Arakan Campaign
 Source: Hillary St. George Saunders, *The Fight Is Won*, Royal Air Force, 1939-1945
 (London: Her Majesty's Stationery Office, 1954), 320.

The Second Wingate Expedition

As with the Second Arakan Campaign, Wingate charged ahead with a second deep penetration operation designed to disrupt the Japanese rear detachments and their LOCs. He also applied the lessons learned from his first expedition. With more air transports available, the Second Wingate Expedition called for the use of glider aircraft, paratroop operations, and clandestine air operations to infiltrate deep behind the Japanese lines (figure 22). The crews of the troop carrier squadrons had minor successes during the first Wingate expedition, but this time Wingate took the air supply effort in a new direction. His force relied solely on air supply, but instead of moving into the jungles of Burma by foot, they were air lifted into the combat area. Doing so meant using the RAF 31st and 62nd Transport Squadrons followed up by the assistance of the USAAF 1st Air Commando Group and TCC.¹³⁰

The Combat Cargo Group

The USAAF was entering a new era of air combat. TCC had successfully supported a separated combat unit with air supply alone and now was performing deep penetration air supply missions behind Japanese lines. These missions, using low altitude airdrops and glider towing operations, were more dangerous than anything the TCC in the CBI had conducted previously. The USAAF Air Staff created a new organization that would handle such missions. Called the Combat Cargo Groups (CCG), these units were

¹³⁰Taylor, *Air Supply in the Burma Campaigns*, 65.

little more than the TCC's own TCG.¹³¹ The only exceptions were how low they flew and where they operated.

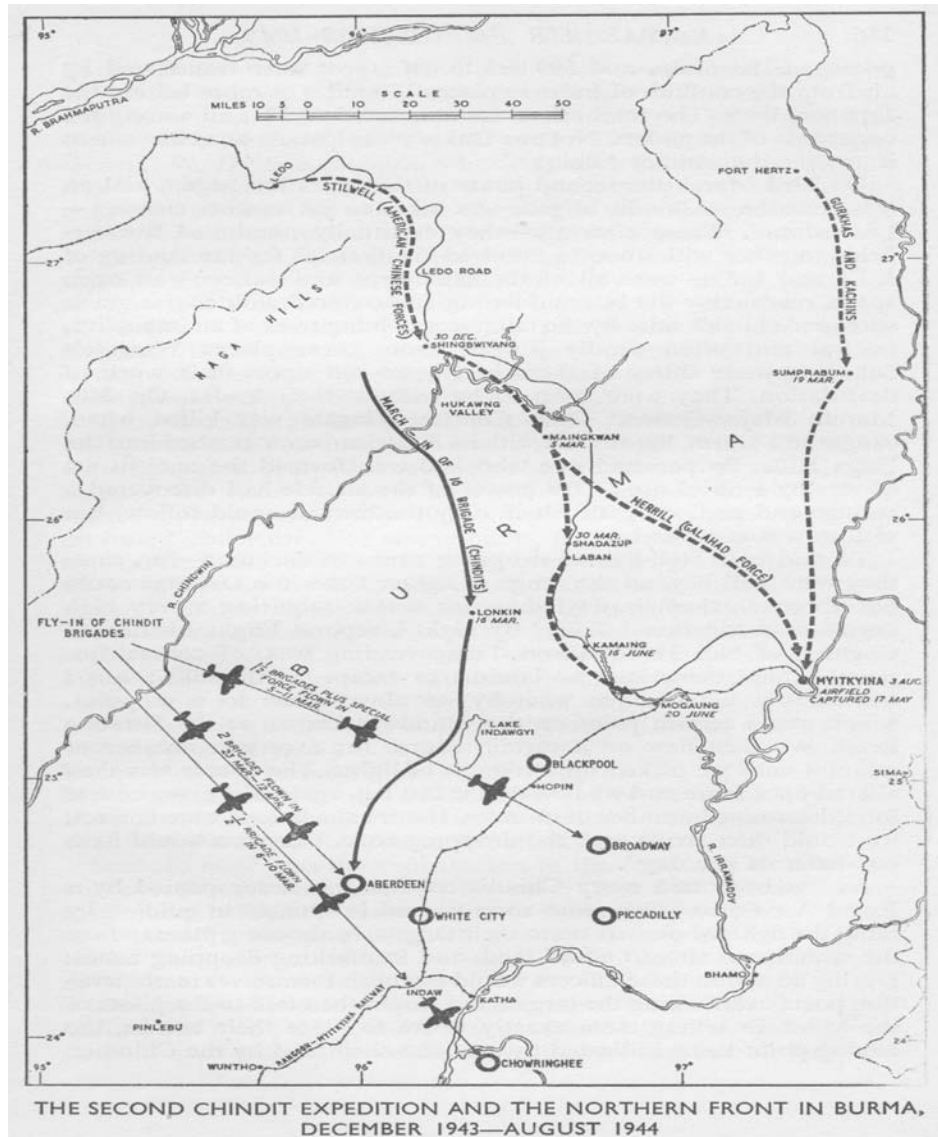


Figure 22. The Second Wingate Expedition and the Air Supply Effort
Source: Hillary St. George Saunders, *The Fight Is Won*, Royal Air Force, 1939-1945 (London: Her Majesty's Stationery Office, 1954), 336.

¹³¹3rd Combat Cargo Group, 1944, Periodic History (IRIS Ref: B0726, Frame 492-568) *History of the 3rd Combat Cargo Group, December 1, 1944 to December 31, 1944* (United States Air Force History Office, Boling AFB, Washington, DC), 1-12.

Interestingly, the concept was so new that the newest combat cargo group formed in the CBI from nothing. The aircrews were pulled from other TCGs to form the 3d Combat Cargo Group. With little time for training on the new tactics, the aircrews relied on previous experiences in glider towing and airdrops and applied the procedures at lower altitudes. The greatest plus to the CCG was its ability to operate autonomously. The TCC and ATC units had large footprints and were tied to specific bases. The 3d CCG scattered its units to various bases around India and northern Burma and allowed its squadrons the freedom to operate.¹³²

Summary

The Allies, split over their strategic objectives for the Far East, agreed in principle that retaking Burma would be necessary to reopen the LOCs to China and to prevent the Japanese from possibly invading India. Stilwell constructed a rather ambitious plan that called for the immediate retaking of Burma and the reopening of the Burma Road. Unfortunately, the lack of combat power and competing strategic priorities prevented this from ever happening. Instead, the Allies had to scale back their plans until the combat power was in place.

The Europe-first grand strategy affected Far East operations. Assets destined to support China were either unavailable or redirected to support operations in Europe or North Africa. This situation was evident in both the First and Second Arakan Campaigns where amphibious operations played a significant role in the planning phase but not in implementation.

¹³²Ibid.

Critical of the Americans' China Policy, the British moved ahead with operations that protected their national interests. These operations included the defense of India and the retaking of Burma. The objectives of the First Arakan Campaign included the retaking of Akyab Island airfield, which could affect operations in southern Burma. The campaign, a terrible failure, was dependent on tactics and procedures that had cost them Burma in the first place. Air supply did not play a vital role in the offensive, perhaps because of other commitments or because the value of air supply was not fully understood. Fortunately, Brigadier Wingate reversed the trend and used air supply in ways deemed unorthodox for the period. Stripping surplus equipment from his men, he relied solely on air supply to keep them in the fight.

After the Cairo Conference, the Allies focused on the Ledo Road and a Second Arakan Campaign in the CBI. Air supply would play a key role in both operations. Though some believed the operations to be a waste of resources, the Ledo Road increased throughput of material to China and placed additional pressure on the Japanese. The Second Arakan Campaign took over from where the first ended. This time, however, air supply supported the effort and reduced the British, Indian, and West African Divisions' dependency on ground LOCs.

Additionally, Wingate initiated a second attempt at deep infiltration and used air supply to airlift his forces deep behind enemy lines. His operation, along with Brigadier General Frank Merrill's Marauders, used gliders and airdrops to press the attack against Japanese rear positions. Designed to be a distraction from the main effort, the Chindits and the Marauders disrupted the Japanese lines of communication and occupied strategic locations deep behind the Japanese front.

Stilwell insisted that, to keep China in the war, he needed the Ledo Road. His plan redirected resources from the Hump airlift operations that provided critical material to China. Stilwell did not believe that the Hump air supply effort could ever deliver enough material to China. However, the Hump air supply operations were ongoing while the Allies conducted the Burma Campaigns.

CHAPTER 4

THE STRATEGIC HUMP AIRLIFT EFFORT TO CHINA

The CBI air supply effort developed out of necessity. With the Burma Road closed, Lieutenant General Joseph Stilwell organized his forces for an invasion of northern Burma. His objective was to re-establish the land LOC between India and China and increase lend-lease throughput to the Chinese and the Fourteenth Air Force. For Stilwell's operations to be successful, he required the extensive use of tactical air supply to his forward deployed units. This use required tactical combat flying, and the TCC trained for such operations.¹³³ While TCC's aircrews supported Stilwell's operations in Burma, the ATC airmen fulfilled his commitment to deliver lend-lease aid to China and the Fourteenth Air Force. This action was the strategic Hump Airlift.

Considerations for Hump Airlift Success

Hump airlift success depended on four major considerations.¹³⁴ The first was painfully clear: The effort needed airplanes and aircrews. The second was moving considerable stocks of materiel to the Assam Valley airbases. The third major consideration centered on maintaining enough manpower at the staging areas to move the supplies to the Assam Valley, and finally, the last obstacle to success was development and construction of adequate airfields in the Assam to meet the growing needs of the theater.¹³⁵

¹³³ Martin, *China Airlift*, 46.

¹³⁴ Weaver and Rapp, *Fourteenth Air Force*, 30-4.

¹³⁵ Ibid.

In May 1942, Stilwell's mission to China was in jeopardy of failing. He and his staff literally walked out of Burma and into India during the Japanese invasion. In Stilwell's own words, "We took a hell of beating." Ever resilient, he was undeterred. Stilwell held a deep desire to retake northern Burma and reopen the Burma Road. Meanwhile, USAAF planners theorized how to meet the needs of the Chinese forces in China and of those who escaped into India. The SOS and the munitions' board set the tonnage levels at 5,000 tons per month to sustain the Chinese war effort. Chiang Kai-shek's emissary, T.V. Soong, countered the board's expectations and requested 7,500 tons per month in ammunition, gasoline, and aircraft spare parts. Disgusted with the situation, Chiang Kai-shek's retort to President Roosevelt prompted an immediate response. In his message, Roosevelt assured Chiang Kai-shek with a promise of providing 10,000 tons per month to the Nationalist Chinese.¹³⁶

Given the air transport situation at the time, providing that amount seemed impossible. The Ferry Command could only deliver 100 tons per month to the Chinese.¹³⁷ Aircraft were slow to arrive in theater, and requirements outside the theater dictated delivery schedules.¹³⁸ Elements of the Tenth Air Force, bombers and pursuit aircraft, began arriving in February 1942. Starting in April 1942, the Tenth Air Force received its first seven C-47s from CONUS and expected to put them to work supporting operations in Burma. After the long, 12,000-mile journey, the aircraft were in need of maintenance and repair before they could conduct their first missions. Repair proved

¹³⁶Romanus and Sunderland, *Stilwell's Mission to China*, 327-35.

¹³⁷Weaver and Rapp, *Tenth Air Force 1942*, 57.

¹³⁸Tuchman, *Stilwell and the American Experience in China*, 311-13.

problematic because few spare parts were on hand. The maintenance teams scavenged parts from other severely broken C-47s to get the newly arrived aircraft flying. The CNAC, which operated a variant of the C-47, supplied the fledgling force from its own stock of spare parts.

C2 Issues within the Tenth Air Force

Nevertheless, the Tenth Air Force tasked the Ferry Command to support both the remnants of the Burma evacuation and to conduct Hump airlift missions. Making matters worse, the C2 of the Ferry Command split over authority and responsibility. Major General Brereton, the Tenth Air Force commander, expected to have operational control over the Ferry Command and its personnel. Ferry Command commander, Brigadier General Henry Old, disagreed and feared dispersion of his personnel and equipment to combat units.¹³⁹ Additionally, Brereton and Stilwell argued over the use of Old's air transports and the auxiliary air supply from the CNAC and Pan American Airways.

Brereton wanted complete control of all air assets flying for American operations, placing them under one air commander.¹⁴⁰ This disagreement necessitated the intervention of General Henry H. Arnold, the USAAF commander. His solution was to create two commands within Ferry Command. The first command, the Trans-India Command, conducted intra-India air operations between Karachi and Assam. The second

¹³⁹Weaver and Rapp, *Tenth Air Force 1942*, 20-59.

¹⁴⁰*Ibid.*

command, the Assam-Burma-China Command, performed inter-India air supply missions from Assam to Burma and to China.¹⁴¹

With only thirteen airplanes on hand, the two commands had to share the assets. The USAAF HQ promised more aircraft, but such a promise was difficult to keep. In addition, transportation of assets to the CBI took on average two months.¹⁴²

From the start, the plan was plagued with problems. The process consumed too much time and manpower. After a few weeks, the Tenth Air Force abandoned the approach, and the two commands merged to form the India-China Ferry Command.¹⁴³

The Need for Adequate Airfields

In late June 1942, Brereton went to North Africa, leaving the Tenth Air Force with Brigadier General Earl Naiden. With the Tenth Air Force still starved for air transports, Naiden reported his greatest problem to providing air supply centered on the lack of adequate airfields.¹⁴⁴

Before the Hump airlift mission could get underway, the Air Staff needed to address the airfield situation in India. When the Tenth Air Force arrived, it found the Dinjan and Chabua airfields operational with a complement of RAF and CNAC airplanes. Some of the smaller airfields existing at the time could not accommodate the large influx of air transports. Short runways, poor infrastructure for loading and

¹⁴¹Ibid.

¹⁴²Ibid.

¹⁴³Ibid.

¹⁴⁴Craven and Cate, *The Pacific: Guadalcanal to Saipan*, 412.

offloading, and lack of taxi space made operations at many of the airfields dangerous or unsuitable for sustained operations. Naiden, now the acting Tenth Air Force commander, reported his situation as desperate and indicated that he could operate only a maximum of 25 airplanes, given the disposition of airfields in the Assam Valley.¹⁴⁵ He quickly requested RAF assistance to construct airfields at Sookerating and at Mohanbari.¹⁴⁶ These airfields were to have hardstands, a minimum of 6,000 feet of paved runway, and adequate taxiways for ground handling.¹⁴⁷

The airfield situation in India placed limitations on both the number and size of air transports. For instance, Chabua became the only airfield that could accommodate the large B-24 aircraft while Dinjan remained crowded with CNAC DC-3s and RAF pursuit aircraft.¹⁴⁸ Furthermore, construction efforts on the airfields in the Assam had to contend with excessive rainfall, an inadequately trained labor force, and frequent Japanese attacks.¹⁴⁹ In addition, the construction crews were in need of equipment. Anything that came into the Assam Valley had to travel via narrow gauge rail from Karachi to Calcutta and then transfer to a medium gauge rail outside of Assam. This transportation slowed

¹⁴⁵Craven and Cate, *Services around the World*, 118.

¹⁴⁶Otha Spencer, *Flying the Hump, Memories of an Air War* (College Station, TX: Texas A&M University Press, 1994), 40-3.

¹⁴⁷Craven and Cate, *Services around the World*, 125.

¹⁴⁸Weaver and Rapp, *Fourteenth Air Force*, 34.

¹⁴⁹*Ibid.*

the cargo arriving from Karachi considerably. In some cases, it took the cargo over two weeks to travel the distance between Calcutta and the Assam Valley.¹⁵⁰

The onus for the airfield construction fell on the British, who promised the Americans three airfields by October 1942.¹⁵¹ However, with the aforementioned problems, only two new airfields were operational. Furthermore, heavy usage took its toll on the existing airfields. Chabua's runway began to crumble under the weight of the C-87s and B-24s, and Dinjan's runway remained crowded with CNAC and RAF aircraft.¹⁵² Other airfields such as Sookerating and Mohanbari were dirt strips converted to concrete runways.

The frustration spread across the theater. American airpower was at the mercy of weather and a tentative indigenous construction force.¹⁵³ Japanese air attacks were successful in scaring away the workers if nothing else did. A constant draw on the local population forced the British to ask American engineer battalions to assist with the construction effort.¹⁵⁴ This project became a self-fulfilling prophecy. The Americans knew that Hump airlift missions could not expand until the Allies solved the airfield situation and quickly deployed the requested engineers to the theater (figure 23).

¹⁵⁰Ibid., 30.

¹⁵¹Weaver and Rapp, *Tenth Air Force 1942*, 57.

¹⁵²Weaver and Rapp, *Fourteenth Air Force*, 34.

¹⁵³Ibid., 30.

¹⁵⁴Ibid., 35.

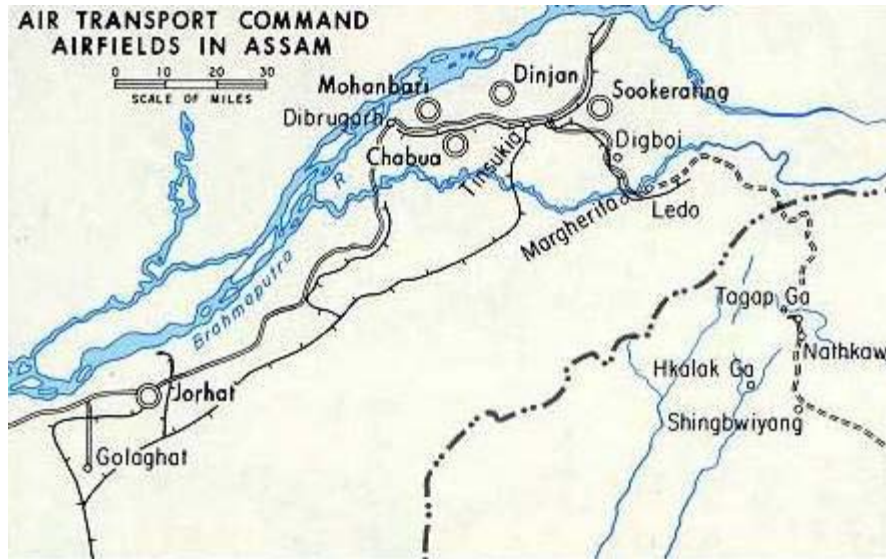


Figure 23. Air Transport Command Airfields in the Assam Valley
 Source: CBI Theater Maps, <http://cbi-theater-7.home.comcast.net/~cbi-theater-7/maps/map21.jpg> (accessed 1 June 2010).

The Lack of Unity and Singleness of Purpose

Despite the airfield situation, the India-China Ferry Command continued to supply both Burma and China. Aircraft orders began to trickle into the theater, increasing the air transport total to 40 assigned C-47s.¹⁵⁵ Colonel Caleb Haynes, the commander of the India-China Ferry Command, saw his command pulled in three different directions. He had to support the India air connection between Karachi and Assam, conduct the Hump Airlift operation, and on frequent occasion, deliver air supply to areas in desperation.¹⁵⁶

¹⁵⁵ Army Air Force Statistical Digest, Table 94, 173.

¹⁵⁶ Craven and Cate, *Services around the World*, 118.

Haynes' situation presented a constant challenge. His support from the leadership of the Tenth Air Force was practically absent.¹⁵⁷ The senior USAAF leaders, Naiden and now Brigadier General Clayton Bissell, the new commander of the Tenth Air Force, seemed destined to let the air supply mission fail.¹⁵⁸ They feared they could never achieve the 5,000 tons per month requirement with what they had available. As Craven and Cate note, "Flatly characterized as 'defeatist' by Frank D. Sinclair, Aviation Technical Adviser of China Defense Supplies, Inc., who made a study of the operation in the field, these leaders viewed the hope of sending as much as 5,000 tons a month over the Hump as quite fantastic."¹⁵⁹ Sinclair agreed the prospect of delivering such tonnage levels with only 18 airplanes would be difficult but doable; however, the command still had some 40-plus aircraft at its disposal.¹⁶⁰ Craven and Cate continue with Sinclair's account, "if 125 aircraft with proper supporting facilities were assigned to the Hump project alone, it would be feasible to carry 10,000 tons a month from India to China by air."¹⁶¹

The Plans Division of the ATC Headquarters reviewed Sinclair's report, and they subsequently returned a recommendation to General Arnold that ATC should assume the responsibility of the air supply mission in the CBI. On 21 October 1942, ATC officially

¹⁵⁷Craven and Cate, *Services around the World*, 118.

¹⁵⁸*Ibid.*

¹⁵⁹*Ibid.*

¹⁶⁰*Ibid.*

¹⁶¹*Ibid.*, 119.

took over the CBI air supply mission.¹⁶² Sinclair's report cited a need for a singleness of purpose from within the theater, noting that the constant diversions of air assets crippled the ability of the Assam-Burma-China Ferry Command to delivery its cargo to the forces in China.¹⁶³

The USAAF Air Staff based the change of control on the understanding that ATC would have full control of the assets in theater—pilots, mechanics, airplanes, and spare parts.¹⁶⁴ The purpose, according to Craven and Cate, was “to work in close harmony with the Theater commander but not to be under his control so far as the conduct of the operation is concerned.”¹⁶⁵

Civilian air transport experts, now commissioned in the Army Air Force, advised the Senior Army Air Force commanders concerning the roles and responsibilities of air supply. The former Chief Executive Officer of American Airlines, Cyrus R. Smith, became General Arnold's Chief of Staff for ATC and reviewed the Sinclair report with earnest. Colonel Cyrus R. Smith contended,

The principal experience of the Air Transport Command is in air transportation, as contrasted with the experience of the Theater Commander being principally in combat and in preparation for combat . . . [t]he India-China ferry operation must be conducted on the best standards of transportation if it is to have maximum effectiveness.¹⁶⁶

¹⁶²Ibid., 118.

¹⁶³Ibid.

¹⁶⁴Ibid.

¹⁶⁵Ibid.

¹⁶⁶Ibid., 120.

Smith continued:

Even if the responsibility should be transferred to Air Transport, there would still remain the job of increasing the effectiveness of communications, bettering the weather reporting and forecasting, materially improving the maintenance of aircraft and engines, and, perhaps, the furnishing of a type of aircraft better suited to the peculiarities of the high terrain operation.¹⁶⁷

The transfer of control became effective on 1 December 1942 in a message from Marshall to Stilwell, outlining the reasons and the expectations for the new India-China Wing of the ATC.¹⁶⁸

The new commander of the ICW of ATC, Colonel Edward H. Alexander, had his work cut out for him. He inherited a command with few operable aircraft, a small number of crews, and few, if any, spare parts to repair existing airframes. He did, however, have support from the ATC. The initial plan called for delivering 75 additional C-47s to Alexander with the further expectations of delivering twelve C-87s and fifty C-46s.¹⁶⁹ In January 1943, the wing received three C-87s. By March, the wing was operating eleven C-87s and seventy-five C-47s.¹⁷⁰

Alexander's India-China wing was still inadequately equipped to deliver the amount of cargo necessary for the sustainment of both the new Fourteenth Air Force and the Chinese army. In a letter to Stilwell, Arnold expressed that his ATC force in theater would be hard pressed to deliver 4,000 tons per month for both Chennault's operations and for the Chinese. This amount was 1,000 tons per month less than previous

¹⁶⁷Ibid., 121.

¹⁶⁸Ibid.

¹⁶⁹Ibid.

¹⁷⁰Ibid.

requirement estimates.¹⁷¹ Additionally, Arnold learned from Generalissimo Chiang Kai-shek, that he expected to see Chennault's force increased to 500 aircraft and that 10,000 tons per month would be needed to sustain the Chinese forces (including the Fourteenth).¹⁷²

In the first eight months of ATC control, Hump airlift tonnage actually declined. The restrictions on airfields, aircrews, and weather contributed greatly to the failure of the ATC to make good on its promise of delivering the necessary 4,000 tons. From December 1942 to July 1943, the ICW delivered an average of 2,213 tons of cargo to Chinese forces over the Hump. The best month total was July 1943, when the wing delivered 3,451 tons (table 1).

Table 1. Tonnage Levels of the Air Transport Command from December 1943 to July 1943.			
Month	Tonnage	Month	Tonnage
December 1942	1,227	April 1943	1,910
January 1943	1,263	May 1943	2,334
February 1943	2,855	June 1943	2,382
March 1943	2,278	July 1943	3,451

Source: Wesley F. Craven and James L. Cate, *Services around the World*, The Army Air Forces in World War II 7 (Chicago: University of Chicago Press, 1958), 118.

The amounts shown in table 1 indicate a steady increase in the amount of tonnage delivered over the Hump by the ICW. Alexander professed that the C-47s were

¹⁷¹Ibid., 120.

¹⁷²Ibid., 122.

unsuitable to handle the high altitudes necessary to traverse the Hump. General Arnold and the ATC staff then worked to substitute the C-47s for the larger C-46s.¹⁷³

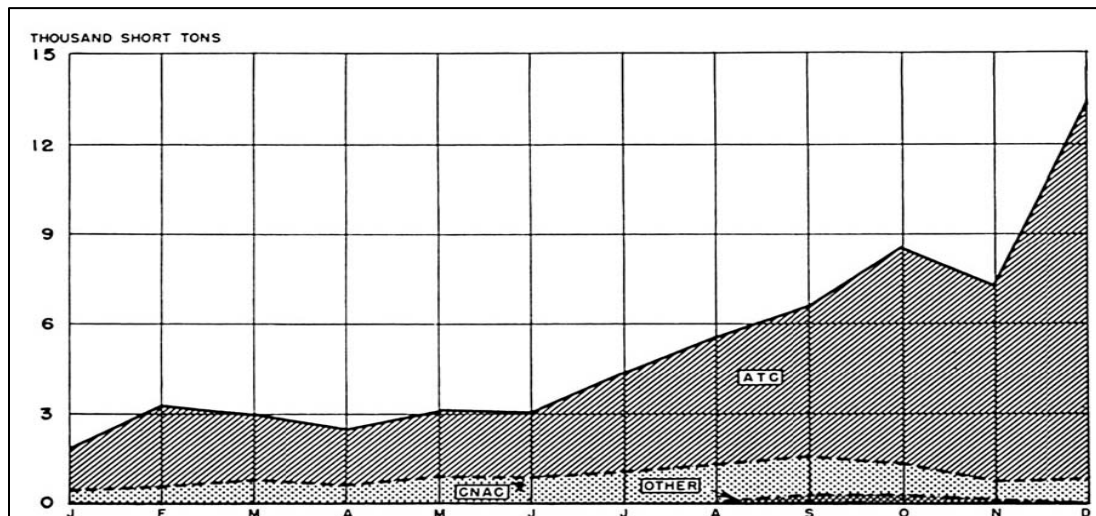


Figure 24. The Hump Tonnage Carried by all Carriers in India-China 1943
Source: Charles F. Romanus and Riley Sunderland. *Time Runs Out in CBI*, United States Army in World War II: China-Burma-India Theater 3 (Washington, DC: Office of the Chief of Military History, Department of the Army, 1959), 284.

A very aggressive delivery schedule provided Alexander with fifty C-46s, with the first thirty aircraft arriving in April and the remaining twenty aircraft delivered by June. Unfortunately, the delivery schedule missed the deadline, and the ICW did not receive its full complement of aircraft until August. With larger aircraft available, ATC ordered an additional allotment of fifty C-87s and twenty-four C-54s for the ICW with a delivery rate of ten aircraft per month.¹⁷⁴

¹⁷³Ibid., 123

¹⁷⁴Ibid.

As the ICW of the ATC received more aircraft, the tonnage levels continued to increase. In May 1943, at the Trident Conference, both Stilwell and Chennault presented their arguments for how they would take the war to the Japanese. Each man presented arguments that portrayed his own effort as the main effort, and both men expected to receive the priority for air resources. The apportionment of air supply made little difference to Arnold and the rest of his staff. They already knew more airlift was necessary because additional plans called for an increase in Hump airlift tonnage. The Air Staff derived the new totals from requests from both President Roosevelt and Madame Chiang Kai-shek for her desire to see her air force succeed.¹⁷⁵ The President ordered the ATC to deliver upwards of 7,000 tons per month to China in July and to increase those amounts to 10,000 tons per month by September, with a steady flow of materiel crossing the Hump routes at 10,000 tons per month thereafter.¹⁷⁶ In order to accomplish the task presented by President Roosevelt, the India-China Wing still needed suitable airfields. The ICW could never achieve these numbers without attending to the maintenance and safety issues in the theater.

Answering the Maintenance Issue and Increasing Aircraft Utilization

To the aircrews, nothing was more critical than maintenance of the aircraft. During a visit to the theater in September 1943, General Harold George, commander of ATC commented, “In this Wing [the] condition of spares for all type[s] [of] transport airplanes [is] similar to [a] gentleman who has several sets of evening clothes, shoes and

¹⁷⁵The Chinese Air Force was also part of the Fourteenth Air Force.

¹⁷⁶Craven and Cate, *Services around the World*, 124.

top hat but has no collar or tie. In such case his evening outfit is useless.”¹⁷⁷ General George directed his Washington Headquarters of the Air Service Command to deliver the necessary spare parts as soon as possible for Colonel Edward H. Alexander and his ICW.¹⁷⁸

Known as Fireball missions, General George’s Air Service Command worked desperately to supply the air transports with desperately needed spare parts. Placing such emphasis on the spare parts situation subsequently increased the number of aircraft available for the Hump airlift missions.¹⁷⁹ Nevertheless, building the capacity and capability to conduct the Hump airlift took its toll on both the SOS and the ICW. Getting the supplies to those who needed them required an extensive network. The ICW tasked the aircrews and aircraft so frequently that accidents and aircraft malfunctions were commonplace.

ATC’s metric of success was tonnage delivered. Anything that detracted from that metric required the USAAF’s attention. Brigadier General William H. Tunner surmised his command could deliver any amount of tonnage so long as it received the necessary number of aircraft and aircrews.¹⁸⁰ This belief was true enough, but the USAAF did not have an endless stream of aircraft arriving regularly in the CBI. Tunner needed to address the dismal maintenance practice in the CBI and increase aircraft mission-capable rates. In

¹⁷⁷Ibid., 129.

¹⁷⁸Ibid.

¹⁷⁹Ibid.

¹⁸⁰Ibid., 140.

July 1944, a technical inspector reviewed the maintenance practices in the India China Division and recommended a production line maintenance (PLM) operation.¹⁸¹

Taken from civilian industry, the PLM operation was an assembly line for maintenance. The mechanics towed the aircraft along a line of specialists who worked on their areas of expertise. The concept of an assigned aircraft maintenance crew disappeared in favor of allowing all aircraft mechanics to work on any aircraft. It streamlined and consolidated the maintenance operations while it increased the level of discipline and supervisory responsibilities of the mechanics.¹⁸²

The ATC received the inspector's recommendation wholeheartedly and ordered Tunner to enact the maintenance program. The senior leaders of the command had only to look at how the PLM operated in CONUS to conclude it was worth applying in the theater.¹⁸³ Unfortunately, comparing CONUS operations to austere environments such as the CBI placed the whole operation in jeopardy, and the plan needed the cooperation of the commanders in the field to be successful. Before the inauguration of the PLM, the India China Division Aircraft Maintenance Officer, Lieutenant Colonel Robert White, wrote the base commanders concerning what to expect and how to implement the process.

The PLM required new hangars and ramp space for towing aircraft down the line. Many of the base commanders White wrote responded with their own set of difficulties

¹⁸¹Ibid.

¹⁸²Doug Slocum and Ed Vaughan, "USAF Maintenance Resource Management," *Combat Edge Magazine* (March-April 2008), http://findarticles.com/p/articles/mi_m0JCA/is_6_16/ai_n24960998 (accessed 12 October 2010).

¹⁸³Craven and Cate, *Services around the World*, 140.

and dissension to the process. They explained they did not have either the space or the manpower required to make PLM work.¹⁸⁴ Many of the bases barely attempted to put the PLM into operation before returning to their old ways. The commanders at Chabua and Jorhat successfully implemented the procedure because their larger airfields provided the necessary accommodations: hangars and ramp space.

The aircrews feared the practice because it changed the relationship of maintenance team and aircraft.¹⁸⁵ They did not trust the specialists working on the aircraft, and they distrusted even more the idea of deadlines placed on repair work.¹⁸⁶ When the aircraft sat on the ramp, the assigned maintenance team gave a level of care that made the plane seem as though it was their own. This sense of ownership by the maintenance crews was obvious to the flight crews. Under the new concept, the only maintenance member still assigned to the airplane was the crew chief.

Tunner deemed the process a success and cited increased mission-capable rates. Of the aircraft he had assigned in early 1945, seventy-eight percent of the airframes were capable of conducting missions. By mid-1945, the rate increased to eighty-five percent.¹⁸⁷ He also noted a twenty-five percent decrease in the time to complete 100-hour

¹⁸⁴Ibid.

¹⁸⁵Ibid.

¹⁸⁶Leo Daugherty III, *The Allied Resupply Effort in the China-Burma-India Theater during World War II* (Jefferson, NC: McFarland, 2008), 157.

¹⁸⁷Craven and Cate, *Services around the World*, 141.

inspections.¹⁸⁸ Maintenance became a force multiplier and efficiently increased utilization rates.

The process remained a challenging proposition but provided some level of efficiency and organization for the Division Maintenance officers. It also re-organized the aircraft types at the airfields. For the PLM to achieve full effectiveness, the mechanics could not work on various air transport types at the same time. For example, a C-47 mechanic worked only C-47s; he did work not on a C-46 or C-54. The India China Division then set out to move like-aircraft types to operate from the same airfields. By March 1945, each of the four Assam bases (Chabua, Sookerating, Mohanbari, and Misamari) were C-46 operators with 48 airplanes each; three airbases (Tezpur, Jorhat, and Shamshearnagar) became C-87 and C-109 operators of 30 airplanes each, and Tezgaon became a C-54 only operation with 39 aircraft assigned (figure 25).¹⁸⁹

Safety

While increasing the maintenance reliability of the ICW aircraft was vital, the safety concerns posed another dilemma. Tunner's mandate from General Harold L. George was to decrease the accident rate and increase the level of safety over the Hump. The reasons for the many accidents over the Hump varied from pilot error to structural failure. In a six-month period between June and December 1943, the India China wing suffered 155 accidents resulting in 168 fatalities.¹⁹⁰ Dr. Carl Frey Constein, a veteran of

¹⁸⁸Ibid.

¹⁸⁹Ibid.

¹⁹⁰Carl Frey Constein, *Born to Fly . . . the Hump: A WWII Memoir* (Bloomington, IN: 1st Books Library, 2000), 69.

the Hump airlift, recalled, “the word went home it was safer to fly bombing missions over Germany than to fly the Hump.”¹⁹¹

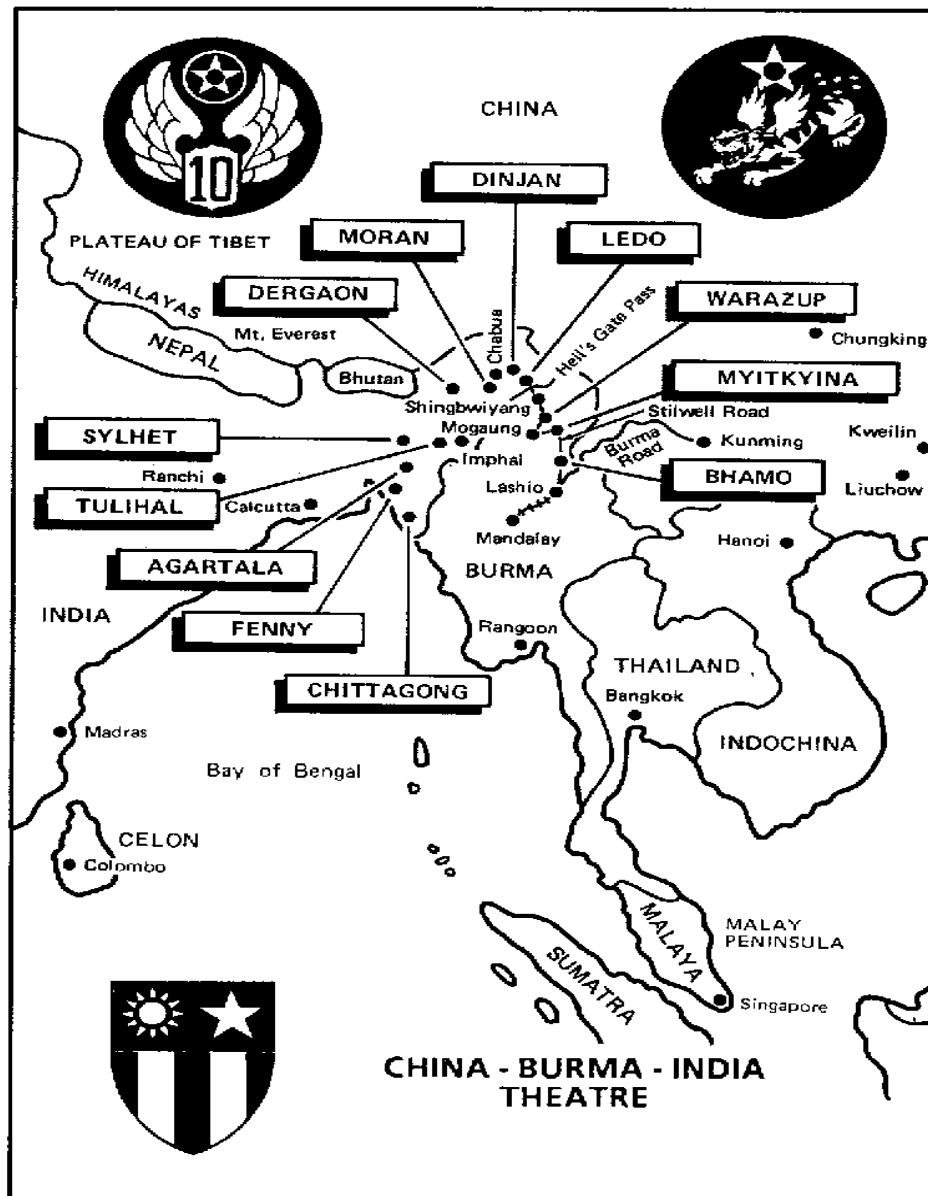


Figure 25. China Burma India Theater Airfields

Source: Imphal, the Hump and Beyond, <http://www.comcar.org/GROUPBASES3rdCCG.gif> (accessed 15 October 2010).

¹⁹¹Ibid.

To address the problem, Tunner made commanders accountable and made members of his staff flight-safety experts. These individuals tracked accidents and conducted minor investigations regarding the cause and effect of accidents. Additionally, he distributed the findings of the accidents to all the aircrews in the Division. Doing so enabled the aircrews to learn from other aircrew mistakes.¹⁹² Tunner observed, “In striving for high aircraft utilization, we will *not* sacrifice flying safety. One hour of daily utilization lost can be made up later . . . the loss of one load of passengers and crew can never be recovered.”¹⁹³

Tunner effectively lowered the accident rate to 1.968 accidents per 1,000 flying hours during the Hump operation. General Cyrus R. Smith wanted more reductions. He later asked Tunner to reduce the number of accidents per week and per month. Smith’s insistence on reducing the accident rates caused Tunner to press his commanders even harder. He asked them to do the impossible, continue the ambitious cargo delivery pace and lower the accident rate.¹⁹⁴

Given the aircraft capabilities and harsh operating environment, this goal was impossible to achieve. By 1945, there were enough aircraft and crews in the theater that tonnage levels should not have been a concern. Instead, when Stratemeyer noted that the Division would airlift less supplies for the month of April (42,000 tons versus the

¹⁹²Billy Hoppe, “Lieutenant General William H. Tunner in the China-Burma-India ‘HUMP’ and Berlin Airlifts: A Case Study in Leadership and in Development of Airlift Doctrine” (Master’s thesis, Air War College, 1995), 6-8.

¹⁹³Craven and Cate, *Services around the World*, 141.

¹⁹⁴ *Ibid.*, 141-2.

previous estimates of 48,000 tons), he took the issue up directly with George,¹⁹⁵ arguing that accidents were going to happen, but Tunner and his staff had made great strides in reducing the potential accidents, more than anyone could expect for a combat operation. Tunner made safety a priority and instituted a process that used more experienced pilots as check-airmen to upgrade pilots and copilots.¹⁹⁶

Another part of Stratemeyer's argument rested with the fact that accident rates had fallen below combat losses. It was this argument that returned the tonnage levels to nearly 50,000 tons per month.¹⁹⁷ The Air Staff agreed that, as long as the accident rates did not exceed the combat losses, the tonnage levels would remain constant.¹⁹⁸ Miraculously, the commanders were able to reduce the accidents and still fly the tonnage levels requested (table 2).

¹⁹⁵Ibid., 143.

¹⁹⁶Ibid., 132.

¹⁹⁷Ibid., 131-33. The sharp increase in aircraft production and delivery and the around-the-clock air operations enabled the ATC to increase the tonnage levels.

¹⁹⁸Ibid., 143.

Table 2. The Hump Tonnage until the End of the War Compared to the Accident Rates				
1945	Hump Lift (ATC) India to China	No. of Major Accidents (ATC Hump Oprs.)	Accident Rate per Thousand Aircraft Hrs.	No. of Crew Fatalities
January	44,098	23	0.301	36
February	40,677	28	0.497	50
March	46,545	41	0.580	45
April	44,254	34	0.511	28
May	46,393	13	0.372	24
June	55,386	20	0.323	17
July	71,042	23	0.358	37
August	53,315	8	0.239	11

Source: Wesley F. Craven and James L. Cate, *Services around the World*, The Army Air Forces in World War II 7 (Chicago: University of Chicago Press, 1958), 141.

Increasing the Stocks of Materiel for Distribution

With the call for increasing the airfield capacities and the sum total of tonnage for the Hump operations, the SOS needed to coordinate activities with the other agencies. The CCS expected the British to assist with the construction of the airfields because these assets would be dual use, supporting operations for the Hump and operations in Burma.

This undertaking required large numbers of specialized soldiers and airmen—engineers, pilots, mechanics, and medical personnel. Those unable to fly over came over by ship. The building of the airfields was already slow, and with the monsoons, the process was delayed even further. Hump airlift missions were continuing despite the hardships, but not to the level Arnold expected. In a letter to now Brigadier General Alexander, General Arnold expressed his concerns that they were still far short of achieving their tonnage goals. With the lacking airfields, the throughput still suffered, preventing Alexander from meeting the goal of 7,000 tons per month. It would not be

until the runways and remaining infrastructure were in place that he would be able to achieve the desired levels.

The ICW did not attain the President's goal to send 7,000 tons per month to the Chinese until October 1943. By then, the remaining necessary runways were completed. The engineers turned their attention to upkeep and preventive maintenance. The amount of use of the airfields was sure to cause great problems for the engineers.

The airfields and airplanes represented a means to an end. Without a stockpile of supplies or necessary resources at the staging areas, the air supply mission was a moot point. The SOS needed to sort out the port situation in India and begin stockpiling necessary cargo so that, once the air capacity was achieved, it could efficiently move the materiel to those who needed it.

The stockpiling of material began in earnest by 1943. American forces took lend-lease material from both the British and the Chinese under reverse lend lease and used that supply to support the Americans.¹⁹⁹ In order for SOS to stockpile materiel, it needed base areas for distribution control. The first base area was Karachi, which became the center of gravity for all construction efforts. After three months, the SOS had a new headquarters, a staging area in the North Malir cantonment with accommodations for about 20,000 persons, and a barracks for 2,000 soldiers.²⁰⁰ Additionally, the engineers constructed an airfield and a depot area that connected to the existing railway network. The airfield served a major purpose. The distance from Karachi to Assam was over 1,000 miles. With the new airfield, the India-China Ferry Command could fly supplies between

¹⁹⁹Romanus and Sunderland, *Stilwell's Mission to China*, 205.

²⁰⁰*Ibid.*

Karachi and the Assam airfields. A trip via land took nearly a month because it shifted from rail to road and back to rail.²⁰¹

Karachi became the chief distributor of American and Chinese lend-lease aid, but other base sections became necessary. The Karachi base became Base Section 1 (figure 26), and Calcutta became Base Section 2. The SOS needed additional base sections, called intermediate and advanced base sections, to serve as stops along the route to Assam. They handled the transfer of supplies from the rail lines to roads and vice versa.

These smaller sections alleviated bottlenecks and congestions. The SOS created three Advance Sections and numbered them sequentially 1 through 3. Advance Section 2 acted more as a transfer point for materiel, where it was transloaded from railway to boat and eventually to airplane. The other advance sections operated like smaller base sections.

²⁰¹Weaver and Rapp, *Fourteenth Air Force*, 34.

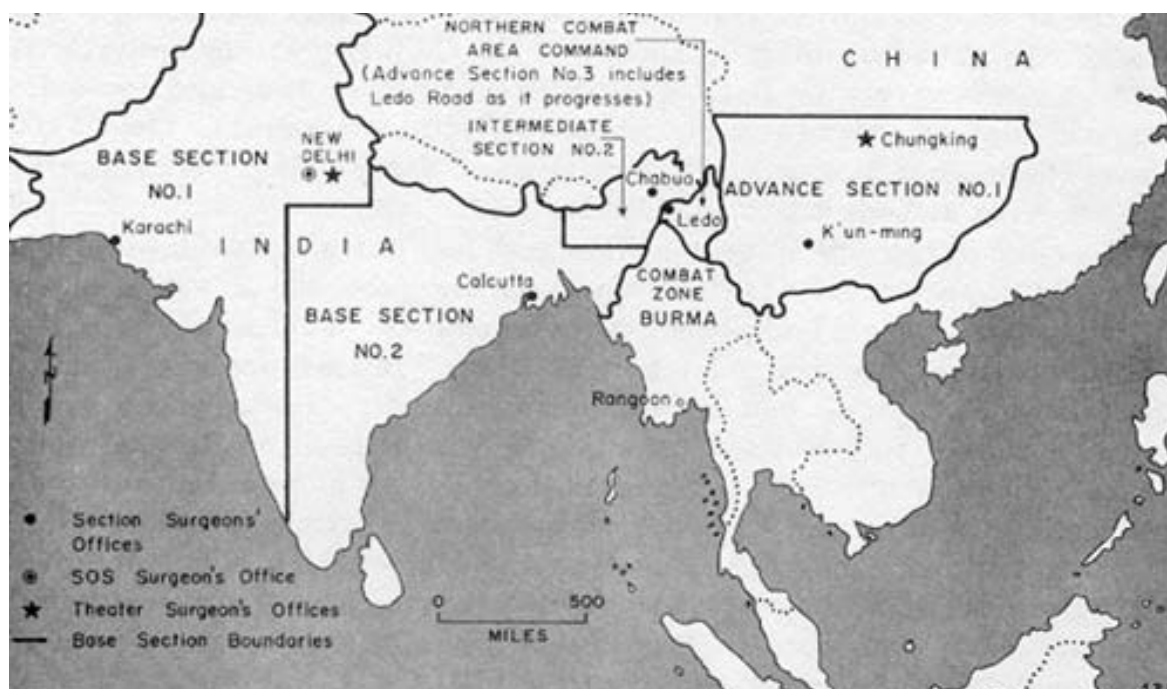


Figure 26. The Base Sections as Defined by the SOS in 1942

Source: China Burma India Theater Maps, http://cbi-theater-7.home.comcast.net/~cbi-theater-7/maps/_Map_Main.html (accessed 1 October 2010).

Stilwell's reluctance to believe in airpower was painfully clear to the air force officers at the time. He refused it during his own evacuation from Burma in the spring of 1942, and he paid little credence to in 1943.²⁰² Stilwell's decision to press ahead for operations in Burma sided with his opinion and experience and the expectations of the period. Use of airpower was a paradigm shift, one he was not prepared to handle. As it was for every army commander of World War II, air supply was relatively new. Few general officers saw its potential except for providing support directly to combat troops in forward deployed locations. Stilwell would not accept the fact that air supply could provide the necessary tonnage to the Chinese and the Fourteenth Air Force. Perhaps the

²⁰²Tuchman, *Stilwell and the American Experience in China*, 292-93.

ATC's rough beginnings and slow progress lingered in his mind, causing him to consider such an operation as too fragile and dependent on so many factors that he could not place his faith with such an operation.²⁰³ Instead, he placed his faith in what he knew and with what he was comfortable with, a land LOC between India and China.

Such an operation would undoubtedly affect Fourteenth Air Force operations. The planners needed to divert air transport assets from the Hump air supply mission to support the road construction effort. It became a competition for air supply between Stilwell's Ledo Road and Chennault's Fourteenth Air Force: Burma versus China.

The invasion of northern Burma in 1943 presented new problems for the SOS and for the TCC. To support the offensive, the SOS needed to expand its supply chain and its network to accommodate both Stilwell's venture in Burma and the Hump airlift to China.²⁰⁴ Stilwell's troops needed air supply for sustainment, and in most cases, the air supply came in the form of airdrop. The SOS did not have enough parachutes or airdropping units available to conduct such operations, so they activated such units on an ad hoc basis.²⁰⁵ Furthermore, the TCC was under particular strain to provide enough supplies for both the Ledo Road construction and the long-range patrols operating in southern Burma.²⁰⁶

General George's visits to the ICW provided great assistance to Alexander and his command. General George's Fireball Express flights were providing supplies for the

²⁰³Ibid., 313.

²⁰⁴Romanus and Sunderland, *Stilwell's Command Problems*, 100.

²⁰⁵Ibid.

²⁰⁶Ibid., 101.

suppliers, keeping them airborne and participating in the Hump airlift effort. By the end of the year, General George recommended to Arnold a change to the current ICW structure. Alexander was ordered to return home to the States to take command of the Caribbean Wing. Brigadier General Earl S. Hoag replaced him

The Hump Air Supply Effort Exceeds Expectations

By December 1943, the advances accomplished by the India-China Wing brought accolades to the flyers and the commanders. The Hump airlift effort was on track to exceed the President's mandated 10,000 tons per month, and Chennault noted that the accomplishments of his command could not have occurred if not for Hoag and his command. The Hump tonnage levels for 1944 (figure 27) far exceeded the required tonnage levels requested by the Fourteenth Air Force and by Chiang Kai-shek. Despite the weather conditions over the Hump and the monsoon season (June – October), the tonnage levels were on a steady increase.

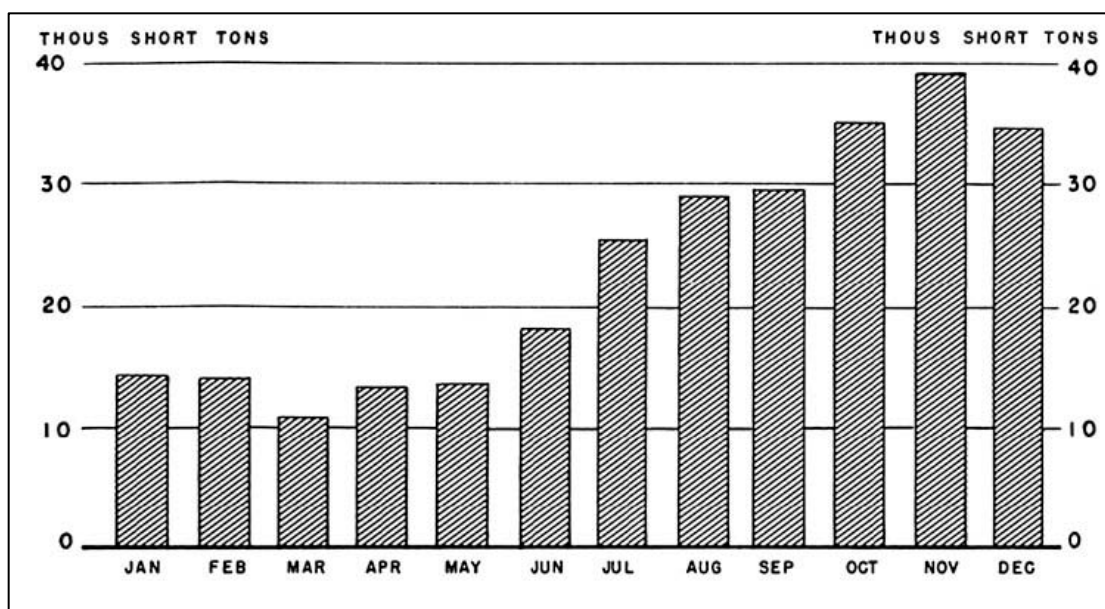


Figure 27. Tonnage Shipped From India to China by Air 1944

Source: Charles Romanus and Riley Sunderland, *Stilwell's Command Problems*, United States Army in World War II: China-Burma-India Theater 2 (Washington, DC: Department of the Army, 1956), 112.

By 1945, the number of aircraft available to conduct air supply missions over the Hump peaked at 332 aircraft.²⁰⁷ The number of personnel assigned to the India China Division peaked at 22,359.²⁰⁸ The tonnage levels surpassed the meager 100 tons per month in early 1942 by a substantial amount. In the last year of the war, the Division averaged over 40,000 tons per month delivered to bases in China.

Summary

The Hump airlift success depended on four key considerations: the construction of suitable airfields; enough aircrews and aircraft to deliver the materiel; the

²⁰⁷Craven and Cate, *Services around the World*, 141.

²⁰⁸*Ibid.*

accumulation and stockpile of materiel; and the labor force able to transfer the materiel from rail, road, and airplane. These considerations were all loosely tied to one another and affected overall outcome of the Hump mission.

With the requirement to keep China in the war, the airlift over the Hump became the lifeline in the sky for a numbered air force and a whole nation at war. The Hump airlift effort effectively became the most important strategic airlift effort to date. The evolution of the operation took a mere three years, as a result of dedication and fortitude in supplying an entire theater by air, despite the challenges of weather, terrain, and enemy activity. Hump airlift crews flew hundreds of hours and delivered thousands of tons of cargo to support Major General Claire Lee Chennault's Fourteenth Air Force and Generalissimo Chiang Kai-shek's Chinese Army.

The process was evolutionary and took the intervention of ATC to make a difference in the support of China and the Hump airlift. It assumed the role of force provider from the Tenth Air Force and actively sought ways to increase productivity and safety over the Hump.

From a broader perspective, the CBI was a microcosm of the much larger war effort. The air forces in the CBI competed for resources from the much larger theaters and were split into two sectors, the CATF and the IBS. These were distinct American sectors but still part of the much larger effort, the SEAC. The confusion associated with the multiple commands in the theater added to the lack of unity of effort for the Hump airlift operation. It was this lack of unity of effort and command that placed the Americans at odds with their two Allies, the British and the Chinese. In dealing with these diverging attitudes, the Americans pressed ahead with their China Policy

recognizing that keeping China in the war could deliver a devastating blow to the Japanese.

The actions of a few innovative leaders changed the course of the airlift effort from a fledgling air supply operation using ad hoc air transports, converted bombers, and civilian air service providers to an organized flow of manpower and materiel. The expectations were high, and the dangers were plenty. However, the crews remained resilient.

CHAPTER 5

CONCLUSION

In spite of a prewar focus on strategic bombers and pursuit aircraft, the USAAF assisted with the requirement to keep China in World War II by conducting two distinct air supply operations between 1942 and 1945. These operations included the tactical air supply missions in Burma and the strategic Hump airlift flights to China. The USAAF accomplished these tasks despite Stilwell's stubborn commitment to the Ledo Road as the main effort to supply the Chinese and the necessary use of tactical air supply to support this and other ground operations in Burma, the key contribution to the success of keeping China in the war against Japan was ultimately the purpose of the strategic air supply missions over the Hump.

The USAAF effort in the CBI was unwavering. With little doctrine, aircrews of the ICW of ATC and from Troop Carrier Command performed the impossible. These flyers sustained an entire nation by air alone and provided a combat air force with the necessary combat support to allow it to wage war against the Japanese in occupied China. These flyers accomplished their mission regardless of the perils they faced. Furthermore, the strategic landscape of the China-Burma-India Theater presented additional challenges not only for the aircrews but also for the allied senior leadership.

From the beginning, the air forces were under constant pressure to produce results even though they arrived in the theater ill equipped to conduct their mission. The arrival of the Tenth Air Force represented an attempt to provide airpower to a theater where the Japanese army air force reigned supreme. Embarrassed, the USAAF Air Staff turned to Chennault's AVG as a stopgap measure to provide air cover for American and British

forces in Burma. The short-lived AVG eventually became part of the USAAF's CATF and provided necessary air cover for the American and British forces retreating out of Burma.

The Japanese conquest of Burma, completed in May 1942, closed the last land supply route between the outside world and China. The loss of the Burma Road represented a major setback to American war planners. They never envisioned such an action could occur. The loss of this vital link to Lend Lease Act materiel became Lieutenant General Stilwell's greatest obsession. Shortly after his forces were forced out of Burma, he planned to retake the country and reestablish the land LOC between India and China. Consequently, Stilwell placed little trust in providing the Chinese with their requirements through air supply. The constant debates on how to properly use air supply reached all the way back to CONUS and the USAAF Air Staff. The intervention of General Henry H. Arnold stripped the air transports from the theater commander and placed them under the new command of ATC. The new command was charged with one mission: meeting the tonnage requirements to keep China and Chennault's air force supplied.

It became the first strategic air operation run from outside a theater of war. The headquarters of the ATC became deeply involved in the progress of the ICW over the Hump and provided it with leadership and equipment to accomplish the mission. Realizing that Stilwell's plans to retake northern Burma were still on the table, the USAAF Air Staff provided his command with troop carrier units so as to not affect the Hump airlift mission. These troop carrier squadrons belonged to TCC and operated as an extension of Stilwell's land forces. Again, his failure to understand air supply created

additional problems for the TCC because their operations exceeded their capabilities. As Stilwell's forces constructed the Ledo Road, they consumed considerable amounts of supplies, requiring constant resupply. This drain on the TCC required outside assistance from the Twelfth Air Force and, eventually, a lessening of the restrictions to allow ATC air transports to conduct tactical air supply missions.

However, the construction of the Ledo Road was not without merit. Stilwell insisted that it could provide the Chinese with 65,000 tons per month in materiel, ten times as much as the Burma Road ever supplied during the dry season. Nevertheless, the ATC air supply effort had surpassed such tonnage levels and could deliver the materiel to several terminal points at a time and do so more efficiently than anything that could travel over the road. From airfields in the Assam, air transports were flying daily and around the clock to airfields in China, delivering the materiel directly where it was needed. Trucks on the Ledo Road made frequent stops along the route and still needed to make the return trip, either empty or loaded for a particular destination. In simplest terms, ATC provided the planners with flexibility and outstripped the Ledo Road delivery process, reducing the delivery time from days to only hours.

The challenges of the Hump airlift were, without question, most demanding. Aircrews flew in some of the worst weather over some of the most inhospitable terrain imaginable. The leadership of the air transport services faced a daunting task to put enough air transports into the air to support the Chinese and to deliver as much tonnage as possible. Even in present-day terms, their actions were amazing, but before they could accomplish such a feat, the land component commanders needed to develop a better understanding of what air supply could accomplish. The problem that made the concept

difficult for them to grasp came from within the USAAF. The USAAF itself failed to understand the value of air transports and fell far behind in the procurement of such weapon systems. The construction effort of the Boeing B-29 Superfortress is hailed as a marvel in aircraft development and construction; however, the Curtis C-46 Commando went from the drawing board to test and development to production in as little as two years, nearly matching the process of the B-29 Superfortress.²⁰⁹

Though plagued with problems, the C-46 represented a major leap forward in air transport aircraft of the period and replaced the smaller C-47 on all Hump air routes. However, the larger C-54 would enter the theater and dwarf the C-46's capabilities in cargo load. American innovation and technology led the USAAF out of the doldrums and into development of some of the most capable airlifters of the Second World War.

Additional national strategic issues and challenges came to the forefront and nearly derailed the effort to supply China. Three distinctive national interests existed between the Americans, the British, and the Chinese. The Americans and British agreed, in principle, to a Europe-first objective. They would defeat Germany first and then turn to Japan. This objective met serious resistance from the Chinese leader, Generalissimo Chiang Kai-shek, who expected to receive the same level of support from the Americans as they were providing to the British. Chiang Kai-shek's position was a precarious one. He was the leader of the KMT and, prior to the war, had been engaged in a civil war with the Communists and their dynamic leader, Mao Tse Tung. The start of the war in the

²⁰⁹1st Special Operations Wing, Hurlburt Field, C-46 Factsheet, <http://www2.hurlburt.af.mil/library/factsheets/factsheet.asp?id=3428> (accessed 15 October 2010); the National Museum of the United States Air Force, C-46 Factsheet, <http://www.nationalmuseum.af.mil/factsheets/factsheet.asp?id=517> (accessed 15 October 2010).

Pacific caused both men to agree on a truce and focus their efforts on the Japanese. Once the war was over, they would resume their own internal struggle for control of China.

The post-war condition of China was always on Chiang Kai-shek's mind.²¹⁰

President Roosevelt promised Chiang Kai-shek that the United States was on his side and would support his nation against the Japanese. However, American commitments were being stretched, especially when the war involved the United States as an active participant. No longer could the United States sit idly by and allow the war to engulf the rest of the world without so much as a stern word.

Once the United States entered the war, the strategic implications of the theater were critical to the successful defeat of Japan. Keeping China in the war forced the Japanese to commit large numbers of combat troops to the mainland, in turn, decreasing their combat power that was needed elsewhere to battle the Americans as they drove across the Pacific on their island-hopping campaigns. Additionally, keeping China in the war would allowed the USAAF to base heavy bombers in China to conduct strategic bombing missions against the Japanese islands.

Within the realm of grand strategy, the CBI was not the Allies main effort. It was a secondary or even tertiary means to an end, one that would constantly play second fiddle to the European and the Pacific Theaters. Despite the lack of resources and commitment, the men who fought in the CBI did not treat it as a secondary effort and performed their missions with honor and ingenuity.

The Americans had to deal with the dissenting views of their Allies. Both the British and the Chinese adamantly disagreed with one another over theater priorities and

²¹⁰Tuchman, *Stilwell and the American Experience in China*, 310.

military objectives. Neither trusted the other's resolve to defeat the Japanese and both bartered for control of valuable lend-lease aid. The British expected to defend what was left of their empire and eventually restore what Japan occupied. The British watched their Pacific empire crumble under the might of the Japanese onslaught and insisted that any efforts to support the Chinese would result in wasted resources. For the British, they could ill afford to divert any necessary combat power away from the defense of India or Ceylon.

The Chinese, on the other hand, simply wanted the promised lend-lease aid and wanted to defeat Japan. Once the war was over, Chiang Kai-shek would end his truce with Mao Tse Tung and the CCP and return to fighting for supreme control of China. He would use the necessary war materiel in his favor and gained a necessary advantage over Mao and the Communists.

The Americans were caught in the middle. If they appeased one, they received the wrath of the other. On many occasions, it was apparent the British attempted to manipulate the Americans into supporting their objectives over those of the Chinese. The idea to construct the Ledo Road, though an American one, raised two important questions: just how capable would the American and Chinese forces be against the war-hardened Japanese Imperial Army, and could the road be completed in time to actually do any good? To prepare his troops, Stilwell needed a training center in India to develop his Chinese army forces. To do so, he would need the support of the British in the form of construction material and supplies.

Keeping China in the war required the Allies to supply it by all available means—ship, railway, road, and airplane. Many of those means disappeared or became

unattainable, and with Stilwell's directive to provide lend-lease aid in jeopardy, a bit of ingenuity and perseverance was necessary.

Challenges at the Operational Level

The Japanese conquest of Burma and successful closure of the Burma Road restricted supply efforts to the Chinese. The Allies—and the Americans in particular—kept their promise to the Chinese and to the Fourteenth Air Force by providing the necessary aid in the form of air supply missions. However, these were no ordinary air supply missions. The crews that flew them faced uncharacteristic dangers related to the operating environment. They had to fly over a portion of the Himalaya Mountains, avoid Japanese fighters, and navigate through often-terrible weather.

First, the air supply effort went beyond strategic support to China; it also included tactical support in Burma. In both instances, the efforts differed. Craven and Cate discussed the Hump airlift as the primary means of keeping China in the war while Romanus and Sunderland wrote in detail regarding the land campaigns in Burma to reopen the land LOC. The situation that developed in Burma indirectly supported the effort of keeping China in the war, even though Stilwell insisted on its opening and believed it would become more important than the air supply routes over the Hump. Stilwell made the Ledo Road construction his primary objective; however, doing so required the assistance of air supply. Even though Stilwell never saw air supply as the main effort or as the appropriate means to supply China, he relied on it as he pressed ahead for reopening of a land LOC through Burma into China. In fact, the construction of the LOC used large amounts of air supply to support the construction effort of a road and pipeline.

The USAAF Response to Apparently Competing Air Supply Requirements
in the CBI to Keep China in the War against Japan

The air supply mission over the CBI went through a major transformation. Air Staff planners originally relied on the civilian CNAC operation to provide aircraft and aircrews. Not until enough aircraft were delivered into the theater could a reorganized airlift effort led by ATC and TCC make a difference.

The amazing story of the Hump Airlift cannot be told without the mention of the CNAC and its pioneering aircrews. They were the first to fly the routes over the tall Himalayas and proved that, with tenacity and good fortune, they could deliver the necessary cargo to a beleaguered nation and a combat-hungry air force. The first Hump flight took place on 30 November 1941 as an experiment to map out a possible route over the Himalayas. The aircrew set out from Kunming, China, in an empty DC-3 and, five hours later, arrived in Dinjan, India. Perhaps a bit of foreshadowing, the CNAC aircrews operated these routes until their operations were absorbed into the USAAF in April 1942.²¹¹

This was fortunate for the USAAF. Upon its arrival in the theater, it possessed no air transports and found little solace in the logistical infrastructure in India or China. Ports of entry were either far from the battlefield or unsuitable due to the threat of enemy air activity. Additionally, resources were scarce. The War Department placed the SOS in charge of distribution of supplies, and when they arrived, the SOS found a dismal array of stockpiled equipment. Making matters worse, there were few airfields for the USAAF

²¹¹Sarah Swan, "China National Aviation Corporation Exhibit Now Open," National Museum of the United States Air Force, <http://www.nationalmuseum.af.mil/news/story.asp?id=123218347> (accessed 1 October 2010).

to operate from in India. Airfield construction would require additional manpower and resources, commodities that were not immediately available.

The construction effort for airfields became paramount because more aircraft were soon to be in the CBI to support operations. With few operable landing strips, logistical bottlenecks and backlogs of cargo would develop, creating more stress in an already stressful situation. With Stilwell's staff in India planning the next major offensive, the Air Staff planners had time to address the airfield and supply distribution problem. Air supply over the Hump was the primary effort. Like any major land campaign, everything else was a supporting effort. Regrettably, Stilwell was not in agreement with air officers of the theater or with ATC. In his mind, the Ledo Road was a far better option. The best way to move the process forward was for ATC to take over the air supply mission from the theater and place a tactical air force with Stilwell's Tenth Air Force.

The ATC staff realized that, for the air transport to be effective, it needed to be centrally managed. Though the parent command was ATC, the introduction of the ICW provided theater-level control. Meanwhile, tactical air supply operations were going to be necessary because of planned operations in Burma. No one disputes that tactical air supply was necessary. What is disputed is whether it was used properly in Burma. With the available assets, it could have supported a limited number of operations. The TCC never received as many aircraft as ATC, and it was forced to split its flying operations over both combat forces and the Ledo Road construction.

The air supply effort in Burma was so different from the Hump airlift effort that it had a direct impact on combat operations in Burma and enhanced the positions of both

Stilwell and British Lieutenant General Slim's forces. Air supply over Burma supported the Second and Third Arakan Campaigns and actively participated in the long-range expeditions of Brigadier Orde Wingate. In those operations, air supply delivered combat power to forward deployed troops. The air supply mission to Burma centered on delivering combat power to troops in the field, and delivery came in three distinct methods: by airdrop, by glider, or by air land. The air supply over Burma was extremely tactical in nature.

All the while, the ICW of the ATC continued to deliver material over the Hump. The Chinese were not the only ones who needed the air supply effort. The American Fourteenth Air Force also relied on air supply to conduct operations against the Japanese.

Major General Chennault argued that his command should be the main effort for American combat power and that he should receive a substantial amount of resources to do his mission. Lobbying for his cause, he requested assistance directly from the War Department, which agreed in part to deliver as much material to his command as possible. His request for the assistance undermined Stilwell's position as the theater commander, and it is this contest of wills that drove the tonnage requirements.

Before this road could be constructed, the Allies had to retake Burma. Retaking Burma meant committing forces, air and land forces, in a region that was totally inhospitable. They would have to invade Burma and take the fight to the Japanese. To make matters worse, the Americans insisted on making the road and the pipeline at the same time while conducting combat operations against the Japanese. Taking on such diverse actions simultaneously was unprecedented. However, Stilwell's faith in the air supply effort was nonexistent. He believed that, if he could open a road to China, he

could deliver all the combat power needed. Opening the offensive in Burma created a subtheater in the CBI and called for the USAAF to conduct two different types of air supply missions: the first, the air supply to Burma, and the second, the Hump Airlift effort to China.

The direct planning accomplished by the ATC brought organization to a chaotic process; however, this process was not flexible enough to handle the situation in the tactical theater—the Burma Campaigns. The situation in Burma was very different. During the Burma Campaigns, the USAAF recognized the need to place large amounts of air transport aircraft back in the hands of the theater commander. The Burma Campaigns called for a robust air supply effort to support combat troops. They would either deliver them, or they would rescue them. The missions the crews flew over Burma contrasted sharply to those flown over the Hump. In Burma, these crews were conducting airdrops of man and material to combat areas. In many instances, they towed gliders and participated in major combat operations. The Hump crews flew only the Hump airlift mission and supported the effort via air land missions. It was seldom, if at all, that the ICW's aircraft towed gliders. The crews that flew the missions over Burma became part of the Combat Cargo Groups around India, designated as such because they flew into combat.

Another important factor that needed to be addressed was that the senior leaders of ATC did not believe they were flying combat missions. They saw missions over the Hump simply as air supply missions, direct delivery of cargo. The crews were, in fact, in constant danger from enemy air patrols. The crews flying missions over Burma were also in constant threat of enemy air attack.

Lessons Learned from the Air Supply Effort in the CBI

The ATC decision to take over the air supply effort over the Hump was unprecedented. It had not done so anywhere else in World War II and was akin to current USAF inter-air operations. Just as ATC took control of the Hump air supply mission, the USAF Tanker Airlift Control Center (TACC), one of the largest air operations centers (AOC) in the USAF, controls all inter-theater air missions today. With minor exceptions, TACC controls and distributes cargo to all the combatant commands. Tasked by United States Transportation Command, TACC effectively controls the air distribution process.

In World War II, the USAAF found itself in new territory, and it desperately needed the assistance of the civil airline executives serving as air transport advisors to General Arnold. These men came to the service in a time of war. As the nation activated their services and respectfully assimilated their airlines into the USAAF, instant expertise for long-haul flying and distribution was acquired and implemented. Civilians, such as C. R. Smith, the president and chief executive officer of American Airlines, assisted in the transformation of the USAAF ATC. It was his estimation that ATC should control the situation in the CBI, and he lobbied for the change with the USAAF senior leaders. They agreed and created the ICW of the ATC.

Thus, in-theater commanders of the ICW did not report directly to Stilwell; instead, they reported directly back to the ATC HQ. This arrangement made changing out commanders easier and fostered more of an ATC mindset for the operation. The commanders of the Tenth Air Force were concerned with offensive air operations and kept their Troop Carrier Squadrons. In that case, the distribution of control was more decentralized. The TCS did not report to ATC and rarely supported Hump air supply

missions. The Hump air supply mission was very much a centralized-control, decentralized-execution operation.

In the minds of the ATC HQ planners, if given the necessary numbers of aircraft in theater, they could move more tonnage over the Hump. By the end of the war, the ICW of the CBI had over 300 airplanes. Still, it was a small number of aircraft considering that the United States produced over 3,000 C-46s during the war. This small share was quite possibly due to the allocation of resources to the theater. The war was still ongoing in Europe, and air supply was used in that theater as well. More C-46s were delivered to the CBI to fly the Hump airlift because of that aircraft's performance and range. Despite the crews' struggles with the airplane, the C-46 carried the bulk of the tonnage over the Hump. Other aircraft, such as the C-54, though larger and more reliable than the C-46, were unable to fly the northern Hump routes and were used on the southern routes. This mix of large-capacity aircraft kept Hump airlift operations moving forward until other aircraft could be used to fill the gap. Douglas C-47s and Consolidated C-87s rounded out the ICW's vast array of aircraft, and they made major contributions. The USAF learned the critical lesson that it needs to employ a mixture of air transport aircraft to accomplish a mission. Today, the USAF fields an array of transports—C-5s, C-17s, C-27s, and the C-130s—for everyday airlift missions and accomplishes the special assignment airlift missions with specialty aircraft such as the VC-25, C-20s, C-32s, C-37s and C-40s.

In an effort to take existing airframes and make them more versatile, the USAF used C-5s for a brief while as a special operations platform. The development and production of the C-17 returned the C-5 to its rightful place as the premier outsized cargo

airlifter of the USAF. Doing so allowed the service to concentrate on developing tactical airlift assets better suited to the tactical environment, such as the C-27 and C-130.

The ICW had the ability to use a mix of airframes to get the mission accomplished. By not settling for just C-46s as expected, the command operated an array of aircraft to fly Hump airlift missions. When the war started, the crews flew anything that could deliver cargo. By the end of the war, those aircrews were flying state-of-the-art air transports.

The only negative criticism that can be made of the ICW was its high accident rate. The accident rate destroyed aircrew morale and became extremely expensive in terms of manpower and aircraft. Safety became a commander's responsibility, and the commanders at the airbases in the ICW were caught up in the need to deliver as much tonnage as possible while reducing the accident rates. To assist his commanders with this problem, Major General Tunner, the commander of the ICW, placed great emphasis on safety and maintenance and expected his commanders at the Assam airbases to do the same. Accomplishing the goals of delivering more with fewer accidents meant doing things by the book and developing standards that the aircrews could adhere to. Tunner's staff tracked the many accidents and identified causes and effects. Reporting this information back to the bases helped the crews learn from the mistakes of fallen comrades. The loss of a crew was being used to educate survivors. Tunner's staff also reviewed the aircraft utilization rates and the effects of fatigue on the crews. These aircrews flew 13- to 14-hour days anywhere from four to five days a week, and fatigue was a major cause of accidents. Increasing the number of aircrews in theater reduced the fatigue levels considerably.

The only thing left to consider was the reliability of the aircraft. With the PLM program, Tunner's staff applied a new way of conducting aircraft maintenance. The PLM worked well enough to increase aircraft mission-capable and utilization rates. Finding enough specialists at the various bases for the various types of aircraft was difficult at best. Therefore, PLM consolidated the various airframes at particular bases, increasing production numbers. By having similar airframes at one location, the limited number of specialists for a specific function could be located in one particular place. They were no longer scattered. This approach worked not just for the men and the aircraft but also for the equipment used to work on the aircraft. This plan is still used today, and just like the situation in the CBI, the maintenance groups around the USAF select mechanics with certain skills and develop them into specialists. AMC, ATC's successor, differentiated the wings into Airlift, Air Refueling, and Air Mobility wings. Doing so kept similar aircraft on one base to maximize effectiveness for the aircrews and for maintenance.

The Burma situation was no different in terms of morale and safety. Aircrew-to-aircraft ratios were much like those of the ICW, but as the war progressed, the aircrew ratios expanded, alleviating the stress placed on the combat cargo groups. These crews flew into just as dangerous airspace as the Hump aircrews. Reducing the stress and fatigue experienced by both types of crews was necessary to ensure aircraft were available to deliver supplies needed to retake Burma and sustain China.

The present day AMC operation can look back on this tremendous effort with great pride. Just as the metric was tonnage delivered in World War II, the modern USAF measures its airlift success in ton-miles per day. The innovations in air transports after the war became a mainstay for USAF airlift operations. In addition, Air Force procurement

practices for weapons systems became more balanced, and the service developed critical airlifters for both strategic and tactical airlift.

The Berlin Airlift and Operations Nickel Grass and Desert Shield instantly put the CBI lessons learned to practical use. In the summer of 2010, the USAF exceeded its own record in airdrops and cargo delivered to a combat force in Afghanistan, a land-locked nation. As long as the service is provided with dedicated men and women, nothing can stop the United States Air Force air mobility mission.

GLOSSARY

Air cargo. Materiel that can be delivered either by airdrop or by air land.

Air land. The ability to move by air and disembark, or unload, after the aircraft has landed or while an aircraft is hovering.

Air operations. Missions conducted by an air force to either support combat operations or to provide sustainment through air supply.

Air supply. Air transport of units, personnel, supplies, and equipment including airdrops and air landings.

Air transport. The movement of materiel by aircraft into and out of a designated theater.

Airdrop. The unloading of personnel or materiel from aircraft in flight.

Airlift. A means of transporting materiel to a theater or through the theater.

Drop zone. A designated point used by airdrop aircrews to deliver materiel.

Strategic airlift. An air operation that exceeds and or traverses the confines of one designated theater for another and delivers durable sustainment materiel, also called inter-theater airlift.

Tactical airlift. An air operation conducted within the confines of a theater and provides time sensitive, direct combat support to forward deployed forces. Cargo is typically of immediate need and considered perishable; also called intra-theater airlift.

APPENDIX A

ORGANIZATION CHARTS OF THE CHINA-BURMA-INDIA THEATER

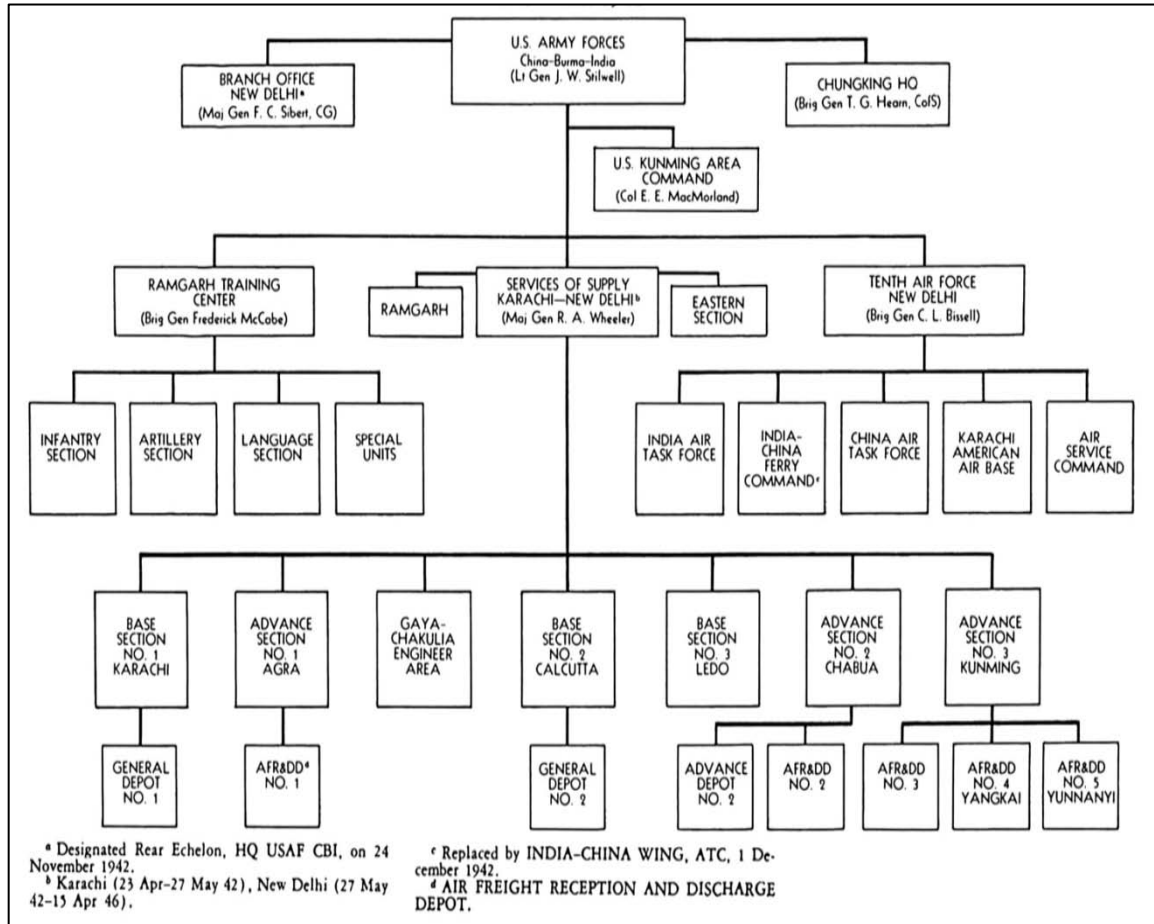


Figure 28. Organization of U.S. Army Forces in China-Burma-India, December 1942
 Source: Charles Romanus and Riley Sunderland, *Stilwell's Mission to China*, United States Army in World War II: China-Burma-India Theater 1 (Washington, DC: Department of the Army, 1953), 195.

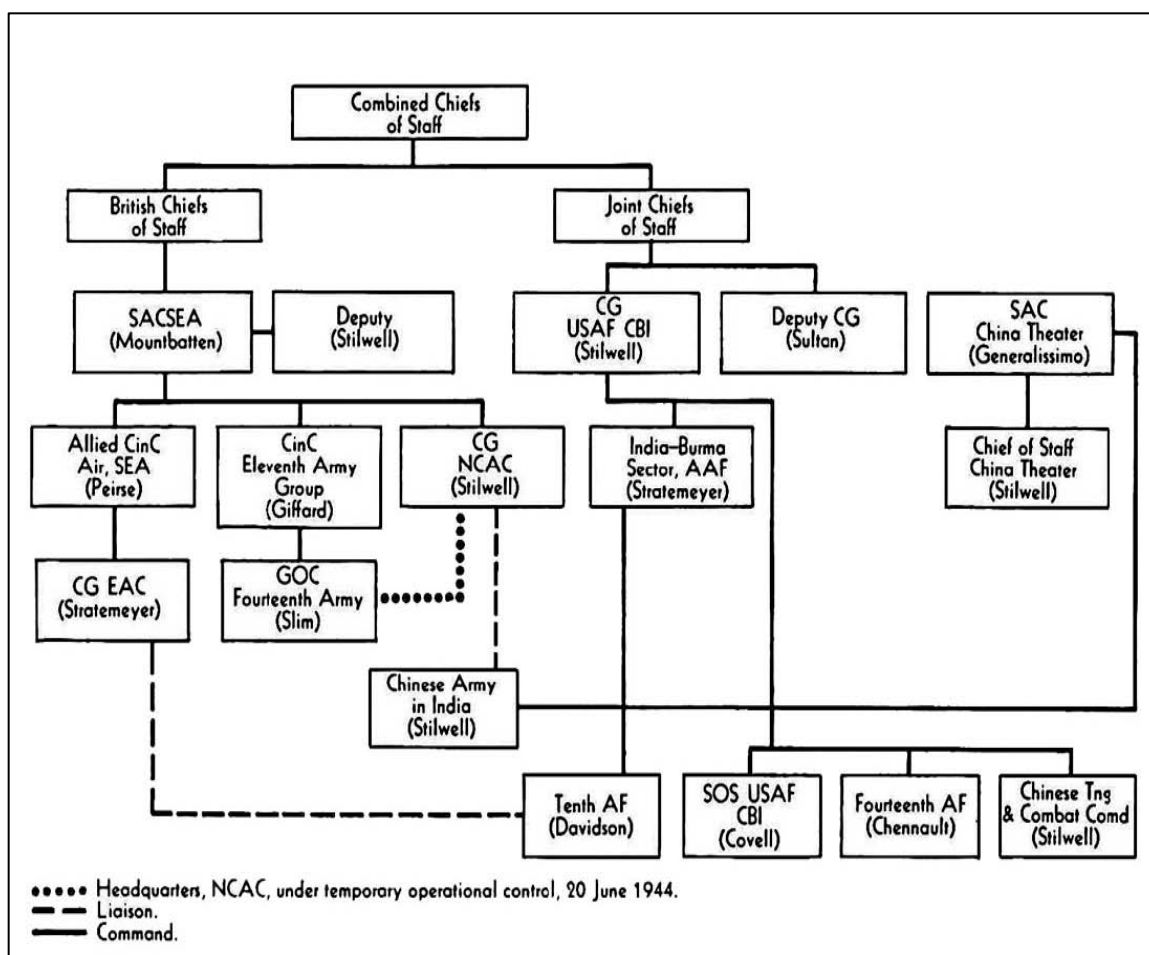


Figure 29. Combined Forces Organizational Chart December 1943 – June 1944
 Source: Charles Romanus and Riley Sunderland, *Stilwell's Command Problems*, United States Army in World War II: China-Burma-India Theater 2 (Washington, DC: Department of the Army, 1956), 6.

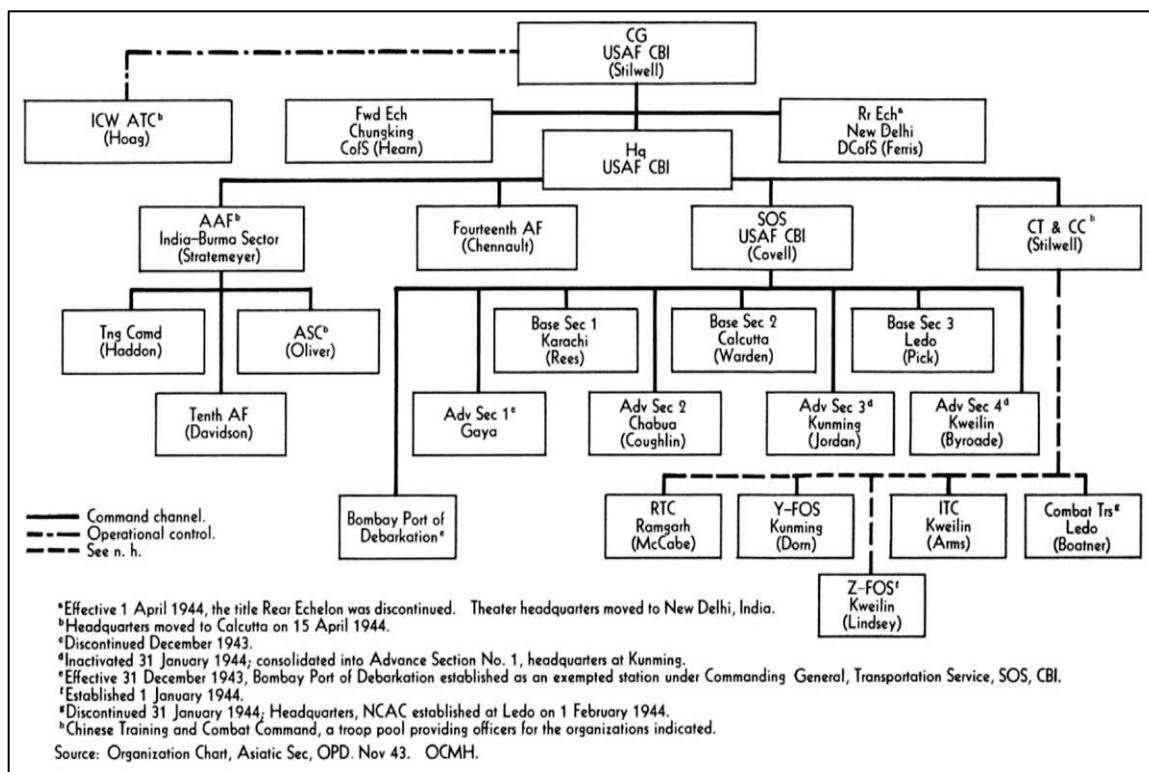


Figure 30. CBI Organizational of U.S. Forces; November 1943-April 1944.
 Source: Charles Romanus and Riley Sunderland, *Stilwell's Command Problems*, United States Army in World War II: China-Burma-India Theater 2 (Washington, DC: Department of the Army, 1956), 7.

APPENDIX B

AIR TRANSPORTS OF UNITED STATES ARMY AIR FORCE

IN THE CHINA-BURMA-INDIA THEATER

Curtis-Wright C-46

The C-46 was developed from a new and unproven commercial aircraft design, the CW-20, which first flew in March 1940. Deliveries of AAF C-46s began in July 1942 for the ATC and Troop Carrier Command. During World War II, the USAAF accepted 3,144 C-46s for hauling cargo and personnel and for towing gliders. Of this total, 1,410 were C-46Ds.

The C-46 gained its greatest fame during WWII transporting war materials over the “Hump” from India to China after the Japanese had closed the Burma Road. C-46 flights on the treacherous air route over the Himalayas began in May 1943. The Commando carried more cargo than the famous C-47 and offered better performance at higher altitudes, but under these difficult flying conditions, C-46s required extensive maintenance and had a relatively high loss rate. In Europe, C-46s dropped paratroopers during the aerial crossing of the Rhine River near Wesel in March 1945. C-46s saw additional service during the Korean War.

TECHNICAL NOTES:

Armament: None

Engines: Two Pratt & Whitney R-2800s of 2,000 hp each

Maximum speed: 245 mph

Cruising speed: 175 mph

Range: 1,200 miles

Ceiling: 27,600 ft.

Span: 108 ft.

Length: 76 ft. 4 in.

Height: 22 ft.

Weight: 51,000 lbs. maximum

Cost: \$233,000

Source: National Museum of the U.S. Air Force, “Curtiss C-46D Commando,” <http://www.nationalmuseum.af.mil/factsheets/factsheet.asp?id=517> (accessed 15 November 2010).

Douglas C-47/C-53 D-3 Series Airplane

Few aircraft are as well known, were so widely used, or were used as long as the C-47. Affectionately nicknamed the “Gooney Bird,” this aircraft was adapted from the Douglas DC-3 commercial airliner. The U.S. Army Air Corps ordered its first C-47s in 1940 and, by the end of World War II, had procured a total of 9,348. These C-47s carried personnel and cargo around the globe. They also towed troop-carrying gliders, dropped paratroops into enemy territory, and air evacuated sick or wounded patients. A C-47 could carry 28 passengers, 18-22 fully equipped paratroopers, about 6,000 pounds of cargo, or 18 stretchers and three medical personnel.

TECHNICAL NOTES:

Armament: None

Engines: Two Pratt & Whitney R-1830s of 1,200 hp each

Maximum speed: 232 mph

Cruising speed: 160 mph

Range: 1,513 miles

Ceiling: 26,400

Span: 95 ft 6 in.

Length: 63 ft 9 in.

Height: 17 ft

Weight: 31,000

Source: National Museum of the U.S. Air Force, “Douglas C-47D Skytrain,” <http://www.nationalmuseum.af.mil/factsheets/factsheet.asp?id=502> (accessed 15 November 2010).

Douglas C-54

One of the great transports in Air Force history, the C-54, was a veteran of World War II and played an important role in the Berlin Airlift and the Korean War.

Douglas Aircraft Company earmarked it for commercial transcontinental transportation as the DC-4. It first flew on June 21, 1938. However, the U.S. Army Air Force requisitioned those in production in 1942 and designated them C-54s. Altogether the service purchased 1,163 during the war, and the aircraft flew 79,642 ocean crossings. It was the first aircraft to fly the North Atlantic routinely and make “flying boats” obsolete.

The C-54 was essential to the success of the Berlin Airlift. The airlift was involved in the first major test of the Free World’s will to resist Soviet aggression in June 1948, when Soviet authorities halted all traffic by land and by water into or out of the Western-controlled section of Berlin. For 11 months, the U.S. and its Allies sustained the city’s 2.5 million residents in one of the greatest feats in aviation history.

TECHNICAL NOTES:

Armament: None

Engines: Four Pratt and Whitney R-2000 engines of 1,450 horsepower each

Maximum speed: 300 mph

Cruising speed: 245 mph

Range: 3,900 miles

Ceiling: 30,000 ft. (service ceiling altitude at which 100 ft/min can be maintained)

Span: 117 ft. 6 in.

Length: 93 ft. 5 in.

Height: 27 ft. 7 in.

Weight: 80,000 lbs. maximum

Source: National Museum of the U.S. Air Force, “C-54 Skymaster,” http://www.alconbury.af.mil/information/heritage/aircraft_print.asp?storyID=123006543 (accessed 15 November 2010).

Consolidated C-87 / C-109

The C-87 was a hastily converted B-24 Liberator introduced into service in 1942. The airplane had multiple retrofits to convert it from a bomber to a transport aircraft. These changes included the removal of armament at the tail gun position and the top spine turret position. Additionally, Consolidated removed the bomb bay and installed a floor and removed the glass bombardier position to install a cargo door to facilitate front cargo loading. An additional cargo door was added to the rear fuselage.

The airplane suffered from electrical problems, hydraulic leaks, and flight control issues. Furthermore, the airplane suffered poorly from CG shifts, thus making the airplane unacceptable for airdrop missions. It also exploded on occasion from trapped vapors in the cargo hold. Procedures were developed to lessen the risk during ascents and descents.

Over 200 B-24s were converted to this variant. The C-109 served as a fuel tanker for the Operation Matterhorn missions, ferrying fuel in a large internal fuel tank.

TECHNICAL NOTES:

Armament: None

Engines: Four Pratt and Whitney R-1830-43 engines of 1,200 horsepower each

Maximum speed: 300 mph

Cruising speed: 175 mph

Range: 1,400 miles

Ceiling: 28,000 ft. (service ceiling altitude at which 100 ft/min can be maintained)

Span: 110 ft.

Length: 66 ft. 4 in.

Height: 17 ft. 11 in.

Weight: 56,000 lbs. maximum

Source: Clayton Kuhles, *Historical Backgrounds*, [http://www .miarecoveries.org/pdf/Website%20-%20Historical%20Background%20Addendum%205 .pdf](http://www.miarecoveries.org/pdf/Website%20-%20Historical%20Background%20Addendum%205.pdf) (accessed 15 November 2010).

HUMP AIRLIFT FLIGHT ROUTES

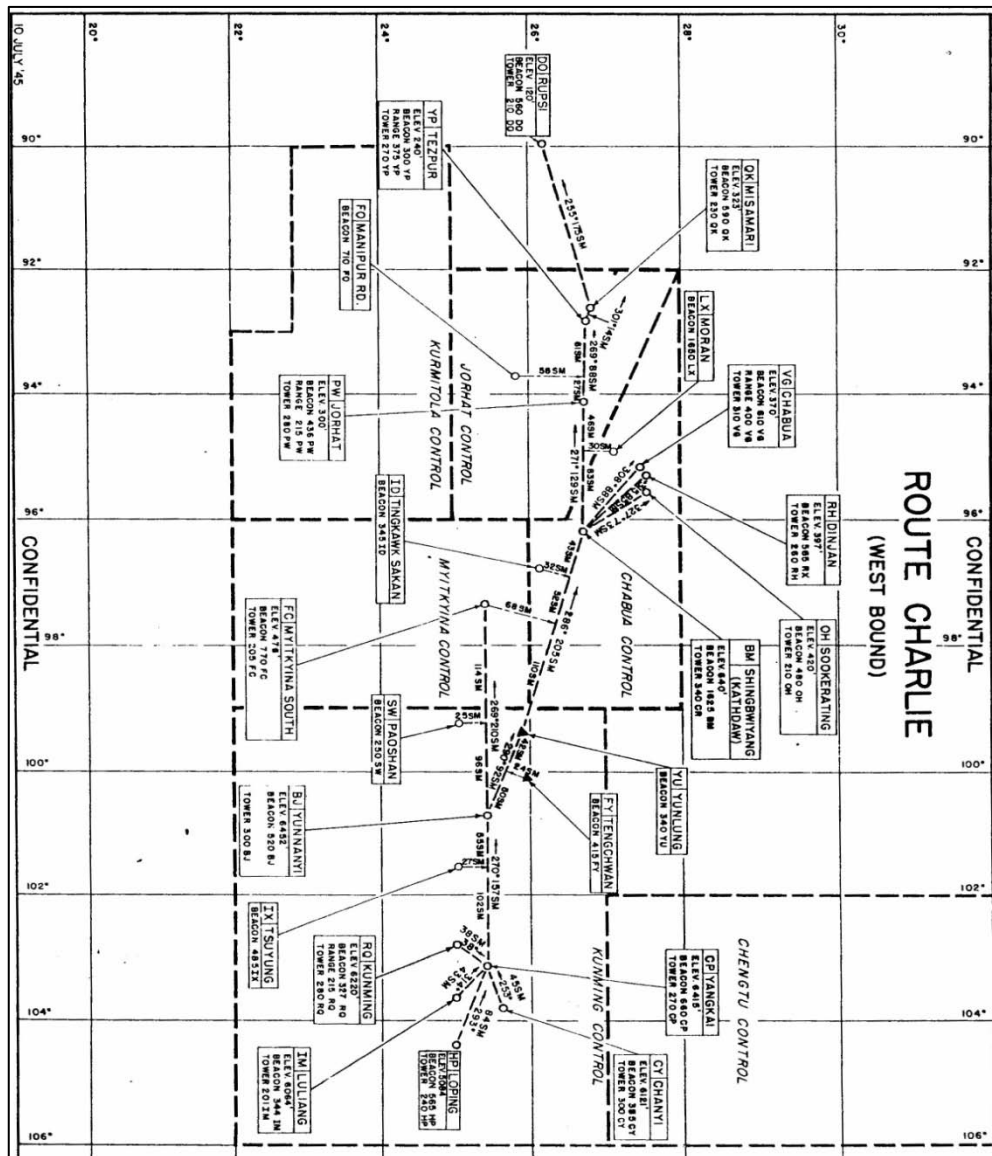


Figure 31. Route Charlie Route

Source: CBI-Theater-7, Maps of the CBI, <http://cbi-theater-7.home.comcast.net/~cbi-theater-7/maps/m2.jpg> (accessed 6 June 2010).

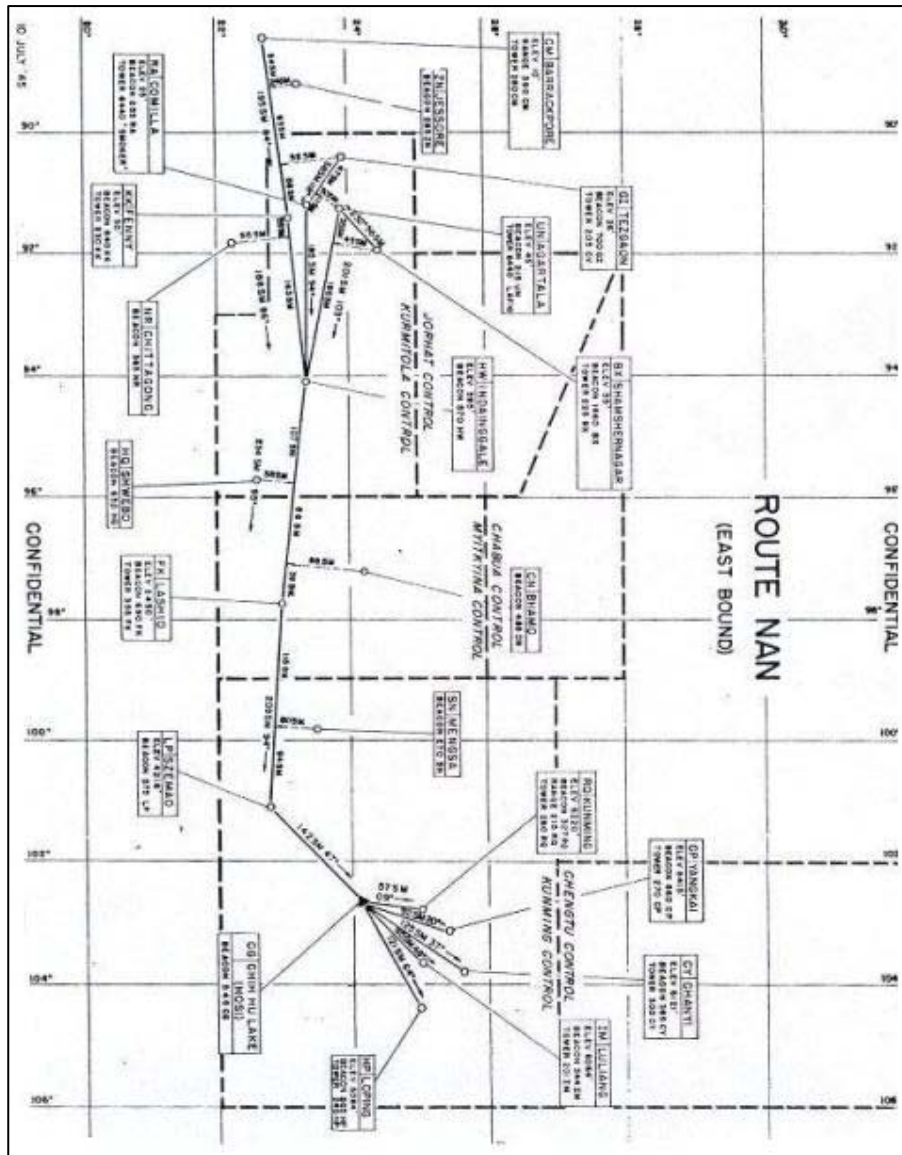
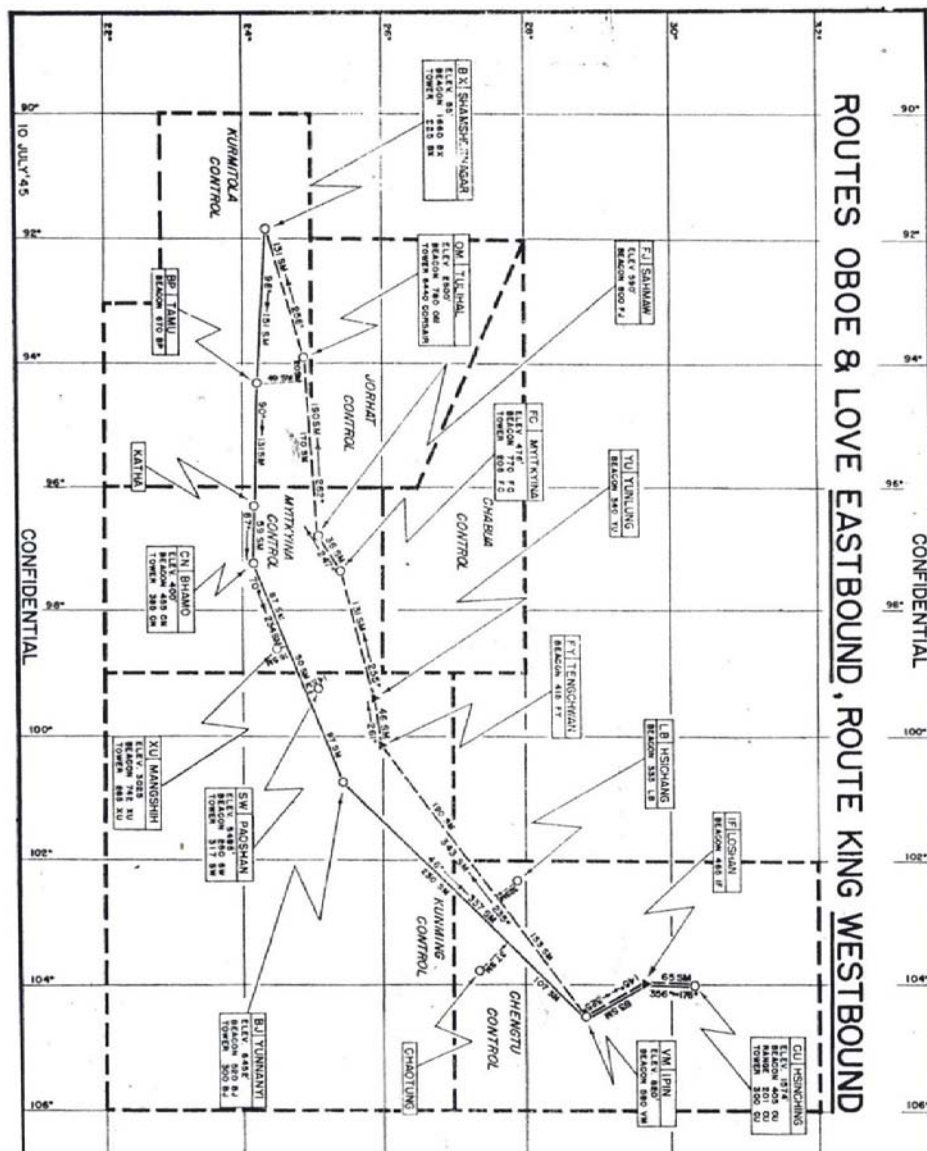


Figure 33. Route Nan Eastbound over the Hump

Source: CBI-Theater-7, Maps of the CBI, <http://cbi-theater-7.home.comcast.net/~cbi-theater-7/maps/m5s.jpg> (accessed 6 June 2010).



APPENDIX D

THEATER MAPS



Figure 36. China

Source: Perry-Castañeda Library Map Collection, http://www.lib.utexas.edu/maps/middle_east_and_asia/txu-oclc-124072553-burma_rel_2007.jpg (accessed 4 November 2010).



Figure 37. Burma

Source: Perry-Castañeda Library Map Collection, http://www.lib.utexas.edu/maps/middle_east_and_asia/india_pol01.jpg (accessed 4 November 2010).



Figure 38. India

Source: Perry-Castañeda Library Map Collection, http://www.lib.utexas.edu/maps/middle_east_and_asia/china_rel01.jpg (accessed 6 November 2010).

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